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PRACTICAL STREET CONSTRUCTION.—STREET WIDTHS

Space Occupied by Vehicles Standing at Curb Lines in Various Positions—Space Required for Moving Vehicles—Calculating Roadway Widths—Isles of Safety—Elevated Railroads.

By H. C. HUTCHINS.*

The question of practical street construction has to be considered from many standpoints. One of the first questions to be considered is the volume of traffic a street can be expected to carry in a satisfactory manner. Just as water pipes, gas mains, electric wires and other conductors are designed for the quantity of water, gas and electricity that they are to take care of, so should streets be designed for the traffic they may be expected to carry. Of course it is impossible to forecast the future in all cases, as the Dutch and English who laid out Broadway and other streets in lower Manhattan Island did not dream that the little settlement on the lower end of Manhattan Island would grow to be a city of over five million, and that Manhattan Island would increase in population until over two million people would live on the island, and other millions would flow daily to and from its multitude of business institutions to their homes in the surrounding cities and suburban towns for a distance of thirty to forty miles, and, in some instances, even greater distances.

As traffic has greatly increased during the past few years on the streets of the city of New York, it has become a very important problem. Streets that were designed for residence purposes have been transformed into business districts, built up solidly with loft and office buildings of great height, which daily house thousands of employees, and the handling of thousands of tons of package freight through narrow streets and load-

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ing and unloading it from wagons and trucks to and from the business houses has become a serious problem.

DATA AS TO VEHICLE SPACE.

One of the greatest difficulties in properly handling traffic in congested districts is that caused by the position of standing vehicles. In 1912, several hundred actual measurements were taken of vehicles standing in different positions. These were classified in six groups as per diagram. (See diagram on next page.)

Position No. 1 gives the greatest amount of room for moving traffic in the street. The following table shows what the average amount of roadway space occupied by different types of vehicles measured:

No. of observations	Kind of vehicle	Average width of vehicle	Average extreme distance
9	1 horse truck	7'-0 $\frac{3}{8}$ "	7'-2 $\frac{3}{4}$ "
21	2 horse truck	6'-10 $\frac{3}{4}$ "	6'-11 $\frac{3}{4}$ "
4	Automobile	6'-6"	7'-3 $\frac{3}{8}$ "
6	Auto truck	6'-5 $\frac{3}{8}$ "	6'-6 $\frac{7}{8}$ "
1	5 horse truck	7'-6"	8'-4"

The extra width due to load varies from 2" to 18".

The actual distance from the curb occupied by vehicles in this position varied from a minimum of 6' 4" to a maximum of 9' 6", with an average of 7' 1 $\frac{1}{8}$ ".

Position No. 2, with the vehicle and horse at right angles to the curb takes up the greatest amount of room for the street and is, therefore, extremely bad from a traffic standpoint. From the loading standpoint, however, it allows a greater number of vehicles to stand in front of any business house than any other method, and



Courtesy U. S. Wood Preserving Company.

ROADWAY CONTRACTION BY TEAMS STANDING IN DIFFERENT POSITIONS.
Reade Street, New York, as it appears during almost any business day.

the loading can be done over the rear end of the wagon from a loading platform. Results obtained were as follows:

No. of observations	Kind of vehicle	Average width of vehicle	Average extreme distance
16	1 horse truck	6'-3 $\frac{3}{8}$ "	16'-9 $\frac{3}{8}$ "
6	2 horse truck	6'-5 $\frac{5}{8}$ "	19'-8 $\frac{1}{8}$ "
2	Automobiles	6'-4 $\frac{7}{8}$ "	14'-3"
5	Auto trucks	6'-0 $\frac{3}{8}$ "	15'-9 $\frac{3}{8}$ "

The actual distance from the curb occupied by vehicles in this position varied from a minimum of 12 ft. 3 in. to a maximum of 21 ft. 9 in., with an average of 17 ft. 8 in.

Position No. 3, where the vehicle stands at right angles to the curb line, with the horses turned so as to stand parallel with the curb. This position reduces the amount of street space taken up by the vehicle and horse together, and also increases the number of vehicles that can be placed at the curb line as compared with position No. 1, but does not permit as many as in position No. 2, owing to the length taken by the horses standing parallel with the curb. Results of measurements were as follows:

No. of observations	Kind of vehicle	Average width of vehicle	Average extreme distance
17	1 horse truck	6'-9 $\frac{1}{4}$ "	10'-11 $\frac{3}{8}$ "
34	2 horse truck	7'-0 $\frac{7}{8}$ "	13'-0 $\frac{3}{8}$ "
1	4 horse truck	7'-3"	12'-3"



Courtesy U. S. Wood Preserving Co.
ONE SIDE OF ROADWAY BLOCKED BY TEAM BACKED AGAINST CURB, AVENUE C, NEW YORK.

The actual distance from the curb utilized by vehicles in this position varied from a minimum of 8 ft. 9 in. to a maximum of 16 ft. 2 in., with an average distance of 12 ft. 4 $\frac{1}{2}$ in.

Position No. 4 is where the vehicle stands at right angles to the curb with the horse turned so as to take up a position about at an angle of 45 degrees from the curb. This position takes up less room than position No. 2, and allows vehicles to stand closer together than does position No. 3.

The actual space occupied by vehicles in this position varied from a minimum of 11 ft. 1 in. to a maximum of 19 ft. 2 in., with an average of 14 ft. 5 in.

The results obtained from the measurements were as follows:

No. of observations	Kind of vehicle	Average width of vehicle	Average extreme distance
25	1 horse truck	6'-3 $\frac{3}{8}$ "	13'-2 $\frac{1}{2}$ "
29	2 horse truck	7'-0 $\frac{3}{4}$ "	15'-3 $\frac{1}{4}$ "
4	3 horse truck	7'-9 $\frac{1}{2}$ "	16'-2 $\frac{1}{4}$ "
1	Auto truck	6'-10"	14'-2"

Positions No. 5 and No. 6 are where the vehicles stand at an angle with the curb line, and the space in the roadway taken up by the vehicle is dependent largely on the degree of angle. The results obtained were as follows:

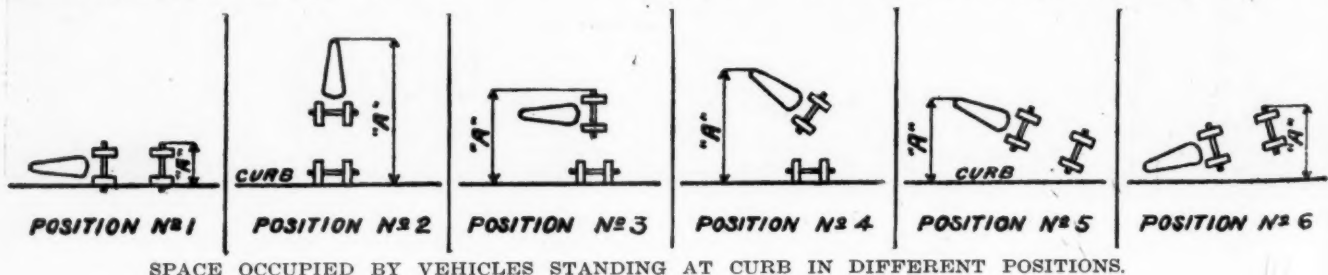
No. of observations	Kind of vehicle	Pos. No.	Average width of vehicle	Average extreme distance
19	1 horse trucks	5	6'-2 $\frac{1}{2}$ "	9'-7"
26	2 horse trucks	5	6'-7 $\frac{3}{8}$ "	12'-2 $\frac{3}{4}$ "
2	Auto trucks	5	7'-3"	10'-11 $\frac{1}{2}$ "
1	Automobiles	5	6'-2"	16'-1"
30	1 horse trucks	6	6'-2 $\frac{1}{2}$ "	7'-11 $\frac{3}{4}$ "
25	2 horse trucks	6	6'-11 $\frac{1}{2}$ "	9'-2 $\frac{3}{4}$ "
2	3 horse trucks	6	8'-3"	9'-7 $\frac{1}{2}$ "
2	4 horse trucks	6	7'-9 $\frac{1}{2}$ "	10'-3 $\frac{1}{2}$ "
1	Auto trucks	6	6'-8"	8'-5"
1	Automobiles	6	7'-0"	8'-1"

The actual space occupied by vehicles in positions No. 5 and No. 6 varied from a minimum of 5 ft. 7 in. to a maximum of 22 ft. 10 in., with an average of 9 ft. 9 in.

Further data were obtained as to the width of motor trucks and the space taken up by them in January, 1916. It was found, as the result of 29 observations, that the widths of motor trucks varied from a minimum of 5 ft. 6 in. to a maximum of 7 ft. 6 in., with an average of 6 ft. 6 in. In 16 cases they stood parallel with the curb in position No. 1, occupying an average distance of 6 ft. 2 in., with a minimum of 5 ft. 2 $\frac{1}{4}$ in., and a maximum of 7 ft. 7 in. In two cases they stood at right angles to the curb, occupying an average of 14 ft. 0 in., with a minimum of 11 ft. 10 in., and a maximum of 16 ft. 2 in. In eleven cases they stood at an angle to the curb in positions No. 5 and No. 6, occupying a minimum of 7 ft. 2 $\frac{1}{2}$ in., a maximum of 16 ft. 8 in., with an average of 9 ft. 11 in.

From the data it can be seen that the space taken up by standing vehicles varies according to their position and that, unless the position they are allowed to occupy is regulated by ordinance and strictly enforced, they may occupy so great a space in a narrow street as to seriously hinder any moving traffic; especially when standing at right angles to the curb they may block up the entire width of the roadway.

An average of all the observations made in 1912 gives an average width, for all classes of vehicles measured, 6 ft. 9 $\frac{5}{8}$ in., with a maximum of 8 ft. 9 in. and a minimum of 5 ft. 4 in. The amount of space taken up by all classes of vehicles in all six positions gave an average of 12 ft. 6 $\frac{13}{16}$ in., with a maximum of 22 ft. 10 in., and a minimum of 5 ft. 4 in. It was observed that when vehicles stood parallel to the curb in position No. 1, they took up more room on the average than the total width of the vehicle, as the average width of the 41 ve-



SPACE OCCUPIED BY VEHICLES STANDING AT CURB IN DIFFERENT POSITIONS.

hicles measured in this position was 6 ft. 10 1/8 in., while the average street space occupied by them was 7 ft. 1 1/8 in.

CALCULATING ROADWAY WIDTHS.

In designing a street from a traffic standpoint, the widths taken by vehicles, both standing at the curb and moving, must be taken into account, so that the street space may be divided into multiples of street traffic. A certain amount of clearance must also be allowed between rows of moving vehicles, as they cannot operate unless such space is provided. If traffic widths of 8 ft. 0 in. are provided, there would be a clearance of approximately 16 in. between moving vehicles, and the maximum vehicle measured, having a width of 8 ft. 9 in. would not pass along the space at all, but would overlap it, causing all the other lines of vehicles to be crowded together. No room would be left for a pedestrian crossing the street who might get caught between two rows of vehicles and injured if only 8 in. clearance were allowed. In designing railroads, subways and street car lines, it is customary to allow at least 2 ft. 0 in. clearance, and preferably 3 ft. 0 in. between moving lines of cars, so that there will be a chance of life for any one caught between the cars. A better traffic clearance for designing street widths, therefore, would be to take at least 9 ft. as a minimum, thereby giving approximately 2 ft. 4 in. clearance for the average vehicle, and this would allow a vehicle of maximum size to pass.



Courtesy U. S. Wood Preserving Co.
BROADWAY, NEW YORK, OPPOSITE CITY HALL.
Too narrow for two lines of traffic on either side of tracks, except at City Hall Park, at the left foreground.

Free wheel vehicles do not move in such exact paths as do railroad trains or street cars, as they are free to vary their path around obstructions and the drivers are not apt to follow fixed paths, but to seek the widest opening for their movement. The capacity of a street would, therefore, be somewhat greater than that estimated on this account.

If street car lines are placed in a street, it is customary in many cities to make the distance between track centers 9 ft. 0 in. This width, therefore, should be assumed for the space occupied by a single line of car tracks. Space for at least one line of moving vehicles should be provided and space for one line of standing vehicles, giving three lines of vehicles in each direction, or a total of six lines, if a two way street with a double track car line is to be placed there. This would give a roadway



FIFTH AVENUE, NEW YORK, SHOWING SIX LINES OF VEHICLES.

width of 54 ft. 0 in. between curbs. This would be the width if the standing vehicles were all made by ordinance to stand parallel to the curb. If they are to be allowed to stand in any position they choose, however, a greater width must be given the roadway, as it was found that the average width to be provided for was 12 ft. 6 13/16 in., which might be increased to 22 ft. 10 in., if no regulation at all were introduced.

On Fifth avenue between 32nd and 44th streets, which is its most congested section, traffic counts have been made showing as many as 510 vehicles passing a given point in 15 minutes, or one vehicle every one and three-quarter seconds. They operate in a roadway 55 ft. wide, in which there are 6 lines of vehicles, 2 lines standing parallel with the curb and four lines moving, giving an average width of 9 ft. 2 in. for each line of vehicles to operate in. Measurements of the speed of traffic show that, owing to the congestion and also to the number of stops required at cross streets to permit crosstown traffic to operate, the average speed is slightly less than five

miles per hour. Farther up the avenue, where the interruptions from crosstown traffic are not so great, the speed average rises to over eight miles per hour. The crossings at 42nd and 44th streets are further impeded by the presence of isles of safety which reduce the width of the available roadway about 4 ft., bringing the average width of space at this point for each line of vehicles down to 8 ft. 6 in., which causes congestion and impedes the speed with which traffic can move.

There are other factors entering into roadway operation which must be considered. For instance, if it is proposed to operate an elevated railroad in a street, the columns should be required to stand inside the curb, as the effect of the elevated railroad columns of the 2nd, 3rd, 6th and 9th avenue lines is to render these streets less flexible for traffic. These columns stand far enough apart to allow a double track line to operate between them. They effectually block the operation of a line of vehicles outside of them in case a standing vehicle at the curb takes up a position at right angles to the curb. While the cost of construction of the railroad would be increased by using longer spans, still it is a question if the amount of space lost for traffic purposes, together with the loss of room for laying pipes, sewers, duct lines and other public utilities, would not offset this.

(To be continued in the March 16th issue.)

EXPANSION JOINTS IN CONCRETE PAVEMENTS

Irvington, N. J., Feb. 26, 1916.

Editor, Municipal Journal,
New York, N. Y.

Dear Sir:

In your issue of February 24, Mr. H. H. Tracy, city engineer of Norfolk, Nebraska, relates his experience with the expansion of concrete in pavements and asks for the opinion of others who have had experience in this work.

During the past two or three years there has been laid several thousand square yards of concrete pavements in the town of Irvington under the writer's supervision. On all of these pavements we have used expansion joints of felt filled with asphalt. These joints are one-quarter inch in width and are placed every thirty-three feet at right angles



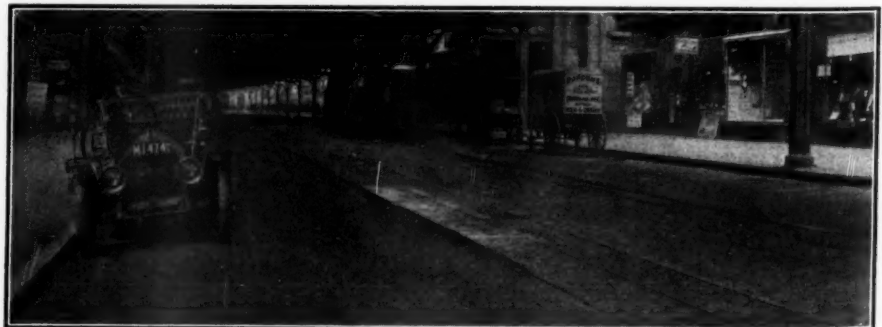
Courtesy, Granite Paving Block Manufacturers' Association.

The top illustration shows Fifth avenue at 42nd street, New York, where an isle of safety is covered and surrounded with people, blocking vehicular traffic. Below this is shown an elevated road at Broadway and 129th street, the columns of which interfere with traffic (the middle strip is little used), although, owing to the width of the roadway, there is ample room between them and the curbs. At the right is shown an elevated road in Church street, New York, with posts inside the curb; but here there is not room for two lines of vehicles between street railway and curb.

to the pavement. We also use a pitch expansion joint along the curb one-half inch in width. The expansion in hot weather has been sufficient to force the felt joint at least one-half inch above the pavement, demonstrating without question the necessity of expansion joints. In all our concrete pavements not a single crack has appeared, and this I attribute to the expansion joints.

The writer examined some concrete pavements in South Norwalk about two years ago. Expansion joints had not been used and about every one hundred feet irregular cracks had appeared.

In the writer's opinion it is not advisable to provide as large an expansion joint as Mr. Tracy suggests, but it would be more practical to provide expansion joints not exceeding one-half inch in width, placing them at frequent



Courtesy, U. S. Wood Preserving Co.

intervals. My experience proves that in this section, where the temperature rarely goes below zero, joints placed every thirty-three feet and one-quarter inch in width are sufficient. The placing of joints at frequent intervals distributes the movement in the concrete more evenly and therefore gives less chance for cracks in the surface. The bituminous top should be sufficiently elastic to take up all movement when properly distributed.

Very truly yours,

J. J. CASEY, JR.,
Town Engineer, Irvington, N. J.

EXPANSION AND CONTRACTION OF CONCRETE

Some Conclusions From Experiences and Tests—Moisture Causes as Much Expansion as Does Heat—Reinforcing—Hydrated Lime

A committee on expansion and contraction, of which Prof. F. E. Turneure of the University of Wisconsin was chairman, presented a very interesting report to the National Conference on Concrete Road Building held recently in Chicago. This report consisted of a compilation of information from published literature, that collected by a circular letter of inquiry sent to all state highway engineers, and results from observations made by the Bureau of Standards in cooperation with the Association of Portland Cement Manufacturers. Finally, the committee presented in a few words the conclusions which it considered may reasonably be drawn from the information obtained from these three sources.

The conclusions of the committee were as follows:

"That contraction and expansion are caused both by temperature changes and by changes in moisture conditions, and that under climatic conditions similar to those at Washington, D. C., the effects from these two factors in concrete road surfaces are approximately of the same magnitude.

"That in concrete roads, contraction and expansion are sufficient to cause frequent transverse cracks unless joints are provided.

"That the actual movement in any particular case depends upon the character of the concrete and of the subgrade. Sloppy concrete shows greater movement than a concrete mixed only moderately wet. No more water should be used than necessary to permit of convenient placing and forming."

Laboratory tests seem to indicate that the expansion and contraction of well cured concrete amounts to .000006 per degree F.

Various experimenters in this country and in England have found a contraction in concrete which was allowed to dry out immediately after molding, two experiments in this country indicating this contraction to amount to .05 per cent in 3 months, while English experimenters calculated that it varied from .02 per cent to .05 per cent for one month, and .04 per cent to .06 per cent for one and a half years; the value depending upon the richness of mixture and amount of moisture, a dry mixture shrinking less than a wet one and those rich in cement more than lean mixtures. Concrete which was allowed to set in water expanded about .01 per cent, but when allowed to dry out contracted about the same amount as air-hardened specimens. Experiments made by A. T. Goldbeck of the U. S. Office of Public Roads were among those just referred to, and these also indicated that changes in moisture content cause expansion and contraction, the maximum effect on new concrete being about the same as that due to the hardening process.

The information obtained from highway engineers was derived largely from observation of contraction cracks

and other phenomena in concrete roads and were largely based upon personal judgment rather than any scientific tests. The general opinion seemed to be that transverse joints were necessary, and that these need not be less than 25 feet apart but should not be more than 50 feet. Several expressed the opinion that the distance between joints which would prove successful would depend, to some extent at least, upon the material of the sub-base; a sandy sub-base, for instance, permitting longer slabs than one of clay. Two or three of the highway engineers believed that wet concrete gave more trouble from cracks than that which was placed moderately dry. One noted that difficulty was found where the expansion joints were not perfectly vertical planes normal to the line of the road; since if the joint was not vertical, one slab tended to climb above the other when expansion occurred; while if it was not normal to the line of the road, there was a tendency for the slabs to move sideways, and if the joint was not straight, longitudinal cracks were likely to start at the angles in the joint.

The observations made by the Bureau of Standards were upon a concrete road 12 feet wide which was constructed of slabs of varying length and cross-sections, on a sub-soil of sandy clay. Under some sections the sub-base was well rolled flat and smooth and the slab made 7 inches thick. Under other sections it was well rolled smooth and given a 3-inch dish to the center transverse with the road, with the idea that this would assist transverse contraction, strengthen the slab by increased thickness at the center and tend to prevent longitudinal cracking. The slabs at these dished sections were 5 inches thick at the sides and 8 inches at the center. Similar sections were also constructed on a sub-base into which 2½-inch ballast had been rolled to make it rough, with the idea that this would afford anchorage and minimize the movement of the concrete. One section on a flat and smooth sub-base was reinforced with American Steel & Wire Company's triangle woven wire mesh. In another similar section 10 per cent of the Portland cement was replaced with hydrated lime. Reference plugs were placed in each slab to permit measurements of movement in the concrete.

There were a number of conclusions from these experiments, one of which was that with a falling temperature while the concrete was new, there was about twice the contraction in the concrete placed in December as in that placed in June. Moreover, the June-laid concrete did not show as much movement at subsequent periods up to six months of age. There was no marked contraction during the period from July to September in any of the slabs, apparently due to the fact that there was considerable rainfall which prevented the concrete from drying out.

Certain of the results indicated that concrete moved more freely on a smooth sub-base than on a rough one, while others apparently showed no difference due to this cause. As to the relation between movement and temperature, in some cases the pavement contracted during falling temperature and in other cases it expanded. During a rise of temperature of 40 degrees from March to May the expansion was only about one-third of that which occurred between December and March when the average temperature was constant. This and other comparisons seem to show conclusively that the amount of moisture added to or evaporated from the concrete had a very considerable effect upon expansion and contraction.

Apparently the dishing of the sub-base decreased somewhat the magnitude of the expansion, which would indicate that there may be some merit in this construction.

Reinforcing the concrete did not appear to affect the magnitude of contraction and expansion.

Certain of the experiments indicated that the addition of hydrated lime had no effect upon the magnitude of movement.

These observations of the Bureau of Standards indicated that for several days after laying, concrete contracts considerably independent of the temperature during laying; that the minimum reached at this time is seldom reached again up to an age of one year; that the movement of the slabs is chiefly affected by moisture, independent of the shape or condition of the sub-base; and that with the moisture remaining approximately constant, the concrete moves with the changes in temperature but always lagging somewhat. Apparently, when the effects of temperature and moisture are combined, the result is to cause a maximum expansion in the spring months when the moisture is at its maximum and the temperature is moderately high, and that the drying-out effect of the hot summer months results in a considerable contraction, bringing the concrete to about its minimum dimensions. Little change takes place during the fall and winter, the effect of decreasing temperature being balanced by that of increasing moisture.

FLOOD DAMAGE IN SAN DIEGO

Water Supply Entirely Cut Off—Temporary Supply From River and Private Company—Damage to Street Pavements and Sewers

The daily press during the latter part of January told of serious damage done by cloud bursts in southern California, including the failure of the Otay dam. Later reports from city engineers and other officials show that the damage to city streets and to water works and other municipal property was even greater than first reports indicated. In San Diego, for instance, all connections between the city and the impounding reservoirs of the waterworks were destroyed and damage done to water mains inside the city limits; bridges in the city were carried away, and several streets received flood waters from the hills or mesa which converted them into brooks which washed out the unpaved shoulders of roadways, undermining the paved portion of the roadway and destroying sewer mains. Similar destruction of bridges and roadways is reported from Los Angeles and other cities also.

During 24 hours there was a precipitation of 6.00 inches at Painted Cave, 5.80 inches at El Monte, 5.57 at Monrovia, 4.67 at Los Angeles, 4.52 at Pasadena. In several places more rain fell during that 24 hours than during all of last year. During the six days of storm, from 6 to 13.12 inches was measured at the several rain gauge stations.

An indication of the damage done in San Diego may be derived from the matter-of-fact monthly report of F. M. Lockwood, city manager of that city. From this it ap-



Courtesy, Los Angeles Express.
FLOOD UNDERMINING RESIDENCE ON VERNON AVE.,
LOS ANGELES.

pears that \$17,800 was diverted from another fund for rebuilding the most important bridges; \$15,700 was added to the street department budget towards putting the streets in condition; \$5,000 was transferred for cleaning out the sumps of the waterworks pumping plant, which were entirely filled in; and \$45,000 was appropriated for purchasing water for the city from a private company until such time as pipes and conduits can be repaired and constructed for bringing water from the city's reservoirs.

As described in our issue of June 12, 1913, water from the watershed of two creeks is impounded in two reservoirs and from these conducted by conduit to Lower Otay reservoir. This reservoir is formed by a rock-fill dam with steel web plate core, finished in 1897, and considered by far the largest and best of this type in southern California. At this reservoir was a chlorine disinfecting plant. From here the water flowed through a 40-inch and 36-inch wood-stave pipe to a filtration plant and thence to the University Heights reservoir, inside the city limits, a total distance of nearly 20 miles.

The flood not only carried out the Otay dam, but damaged the conduit leading from the upper reservoirs to the Otay, and several other sections of pipe and other structures. It is impracticable to wait until the Otay dam can be rebuilt before using the supply from the watershed; therefore it was decided to repair the upper part of the conduit leading from the upper impounding reservoirs which will discharge into the creek. After flowing in the creek channel to a point $5\frac{1}{2}$ miles from the upper Otay reservoir, the water will be diverted to this reservoir by a flume. A pipe will connect the upper Otay reservoir with the outlet tower of the lower Otay (which apparently was not seriously injured) and from there the water will flow through the old conduit to the filtration plant and the University Heights reservoir. The disinfecting plant has already been brought from the lower Otay reservoir and installed at University Heights, where it treats all water used by consumers, being that pumped from the river by the old Mission Valley pumping station and the additional amount purchased from a private company. It is planned also to install an air lift plant to lift water from wells in the river bottom to sumps of the pumping plant, which will discharge it into the University Heights reservoir.

In spite of the destruction of lower Otay reservoir the city had stored in the reservoirs on February 1, 4,337,699,000 gallons more than on January 1, or 15,701,799,-



Courtesy, Los Angeles Express.
FLOOD FLOWING THROUGH SEVENTH STREET, LOS ANGELES.

000 gallons altogether due to the filling of all the reservoirs by the rain. (The loss from the reservoirs by seepage and evaporation is about 200 million gallons a month.)

Removal of the dirt washed upon the streets placed considerable additional cost upon the street cleaning service of San Diego. The rotary sweepers cleaned 40 miles of streets during January and the average cost was \$38.05 a mile; while in October these sweepers cleaned 155 miles at an average cost of \$6.90 a mile.

HARTFORD WATERWORKS NOTES

Hay and Wood Form Department Property—Tightness of Joints in 42-Inch Pipe—Testing Rock Foundations—Hypochlorite and Liquid Chlorine

In the 1915 report of the Board of Water Commissioners of Hartford, Conn., the chief engineer of the board, C. M. Saville, makes brief reference to a number of items concerning the work of the department during the year which will undoubtedly be of interest to waterworks officials in other cities. Some of these items are as follows:

All of the hay required by the department for use during the year, amounting to 40 tons, was harvested by the department on its own grounds. In addition to this a small amount was sold standing and there are about 14 tons now on hand.

The practice of last year was continued in sending the pipe-laying force to the reservoir wood lot when the condition of the ground became such that city work was stopped. Considerable clearing of undergrowth was done and about 630 cords of wood were cut by this force and 63 cords by The Hartford Electric Light Co. together with a large number of fence posts. About 118 cords of this wood have been sent to the City for use on pipe-laying work during the coming season. In all there are now on hand over 800 cords of wood, about 80 telephone poles and 700 chestnut and 175 cedar fence posts. Almost all of the wood cut was from areas affected with the chestnut blight. That disease has obtained a great foothold in this part of Connecticut, and next year a great deal of cutting should be done about the reservoirs in order to get the greatest value possible from the forests.

The practice of tree planting has been continued, and about 30,000 pine transplants were set out. It will probably be desirable to continue this work vigorously for several years to come, reforesting with conifers areas now covered with the chestnut that must be removed.

The Board, very wisely recognizing the inadequacy of pipes of small diameter to meet present conditions of growth and fire service, voted to install in the city limits no mains of smaller size than 8-inch diameter except in case of streets fed at both ends and of not over 500 feet in length. Under such conditions a 6-inch pipe is laid.

TESTING 42-INCH CAST IRON PIPE JOINTS.

In connection with extensions of its water supply system, Hartford laid 39,850 feet of 42-inch pipe connecting the Nepaug reservoir with a concrete conduit. After laying was completed, the entire line was tested to determine whether it met the specified requirements as to tightness. These provided that the leakage should not exceed "2 gallons per 24 hours per linear foot of pipe joint, the length of joint to be figured on the nominal interior diameter of the pipe."

The line was tested in eight sections, the longest of which was 9,430 feet and the shortest 383 feet. The

pressures to which the various portions of the line were subjected on test varied from 46 to 138 lbs. per square inch, averaging about 120 lbs. per square inch. This was everywhere at least 43.5 lbs. per square inch more than the line would be called upon to withstand in ordinary future operation.

The actual leakage, as measured on the final tests of each section, was 0.745 gallons per 24 hours per linear foot of pipe joint for the whole line, or 87.9 gallons per 24 hours per inch-mile of pipe. The maximum rate of leakage in any section tested was 1.95 gallons in 24 hours per linear foot of pipe joint, and the minimum was 0.0083 gallons.

TESTING DAM FOUNDATIONS.

Two dams are under construction, and before beginning actual construction work the rock foundations of both were subjected to a most searching investigation by means of drill holes put down 15 to 25 feet at very frequent intervals. The holes were first blown out with air and then tried out with water under a pressure considerably greater than that of high water in the proposed reservoir. If there was any leakage of water, liquid cement was forced into the hole until no more could be forced in under 100 pounds pressure. Holes which were tight under water pressure were filled with grout.

At the Nepaug dam, built of cyclopean masonry, all loose and disintegrated rock was removed and holes drilled 15 feet apart, staggered in two lines, near the up-stream face of the dam. Thirty-seven holes were tested and took 8.9 cu. yds. of grout containing 26 barrels of cement. The maximum amount of grout taken by any one hole was 1.49 cu. yds. containing $3\frac{1}{2}$ barrels of cement.

The Phelps Brook dam is of earth with concrete core. The core trench was excavated with a derrick and orange-peel bucket. When ledge rock was reached, two lines of holes 15 feet apart and staggered were drilled about 25 feet into the rock just in front of the location of the core wall. These were tested for leakage and grouted under a pressure of 75 lbs. per square inch. Sixty-seven holes were tested, which took a total of 51.5 cu. yds. of grout containing 113 barrels of cement. The maximum amount taken by any one hole was 7.04 cu. yds.

STERILIZATION.

On account of the heavily traveled main highways passing through the watersheds in close proximity to the reservoirs and the comparatively large number of inhabitants on the watershed of reservoir No. 4, it seemed proper to take precautionary measures to prevent such epidemics of water borne diseases as have been traced to water supply sources in neighboring towns and cities. For this reason all water coming to the city for the past two years has been treated with hypochlorite of lime or chlorine gas, and a practically sterile effluent has been furnished for city consumption. Daily bacteriological examinations are made of samples of raw reservoir water, treated water from the mains a short distance below the sterilizing plant, and of water taken from a tap in the city. The raw water has shown bacterial counts as high as 39,000 per cubic centimeter and Colon Bacilli have been found from 9 to 23 times in samples of 10-c.c. or less during every month of the year. In the treated water the Colon Bacillus has been practically absent all of the time and the total bacterial removal has averaged 99.8% with a use of 0.95 parts per million available chlorine, equivalent to about 0.05 grain per gallon.

Up to December, 1914, hypochlorite of lime was used as a sterilizing agent and, while effective in its results, it was unsatisfactory on account of the cost of operation because constant attention was required. An automatic chlorine gas plant was then installed. The labor cost of attention is practically eliminated and less chlorine

is used to obtain the required standard of bacterial elimination.

During the operation of the hypochlorite plant, the amount of "available chlorine" used was about one part per million or approximately 25 lbs. of the chemical per million gallons of water treated. The liquid chlorine plant was at first regulated to deliver about 1.0 part of chlorine per million parts of water. This rate was gradually reduced to .65 p.p.m. or about 5.4 lbs. per million gallons of water, and it is probable that this amount can be further reduced.

ALGAE GROWTHS.

Four reservoirs produced considerable growths of algae, principally diatom asterionella and anabaena, due probably to the fact that these reservoirs were not cleaned of organic matter. The filtration plant is expected to remove the odors and tastes from these. Meantime, copper sulphate has been used with considerable success.

SEWAGE PUMPING IN SCHENECTADY

Automatically Controlled Motors Operate Centrifugal Pumps—Screenings Removed by Pneumatic Ejector—Construction in Wet Sand—Making Tight Joints

Several months ago there was described in Municipal Journal the sewage disposal plant then nearing completion for treating the sewage of the city of Schenectady, N. Y., which sewage treatment involved an interceptor and a pumping station for carrying the sewage to the treatment plant. Located in Schenectady are works of the General Electric Company, in which are about 20,000 employees, and the waste water from this plant was an important factor in the river pollution. The works had previously been drained by the combined system, but the company willingly agreed to change to the separate system at its own expense. The new system for carrying dry weather sewage only involved about 7 miles of sewers and also required a pumping station. The entire cost of the new system, including engineering, was about \$100,000, including \$20,000 for the pumping station.

Previous to designing this new system, measurements had been taken in the old system with Bristol recording gauges to determine as nearly as possible the dry weather flow, which included trade waste as well as sewage from toilets, etc. The average quantity of sewage was found to be about one and a quarter million gallons per day, but with maximum rates much higher than this.

The construction of the sewer system was of more than ordinary difficulty because the material through which the trenches were run was mostly sand, and water was encountered from 6 to 8 feet below the surface; in addition to which, the plant contained great numbers of water, gas, oil, air and steam pipes, and several sewer lines had to be run through storage yards filled with tons of castings and lumber. Also it was necessary to avoid as far as possible interference with the network of industrial tracks laid throughout the plant.

Wherever the sewers were laid below the ground water level, some water-tight jointing material, in most cases "Jointite," was used. After completion of the system a test of the infiltration was made and this was found not to exceed one gallon per 24 hours per foot of sewer, which had been set as the allowable limit.

The pumping station also was excavated in fine sand, and as it was carried to a depth of 25 feet below the surface and ground water was met at about 8 feet, it was necessary to line the excavation with close sheathing. Three-inch splined piling was used, braced with 12x12

timbers across the opening. The building is entirely of concrete, 22x28 feet outside dimensions. The underground part was divided into two wells, one dry well containing three centrifugal pumps and a pneumatic ejector, separated by a wall from the suction well into which the suction from the pumps and the ejector intake were extended. The sewage entered the suction well at the side opposite the pump well and passed through two screens before reaching the suction openings. The opening from the sewer into the suction well was provided with a shear gate.

The three centrifugal pumps are driven by vertical, squirrel-cage, induction type motors, wound for 550 volts, 40 cycles, quarter-phase. Two of the pumps are operated by 10 h. p. motors and one by 15 h. p. One of the pumps is provided with a pulley so arranged that in case of the failure of the other motors, this pump can be operated by a belt-driven motor.

Each motor is automatically started and stopped by a self-starter of the contactor type provided for current-limit acceleration and equipped with low voltage release. The self-starters are controlled by a pilot circuit which is opened and closed by a totally enclosed single-pole float switch. The chains connecting the floats to the starting switches are of different lengths, so that as the sewage reaches the lowest float the pump connected therewith will be thrown into operation. Should the sewage continue to rise until it reaches the second float, pump No. 2 would be thrown into operation, and should these two not be able to handle all the sewage, the third pump would in like manner be thrown into operation when the third float was reached.

The quantity of screenings from this plant is considerable. Incineration of them would be costly and otherwise objectionable, and it was decided to discharge them also into the force main sewer; but instead of passing them through the pumps, where they might clog them or produce wear or other objectionable effects, the following plan was adopted. The two screens in the suction well previously referred to are nearly vertical, and at the bottom of each is a depression connected to 12-inch pipes, which in turn lead to a pneumatic ejector. As often as seems necessary, the screenings which have collected on the screens are pushed down into these depressions, the valve in the 12-inch ejector pipe is opened and the static pressure of the liquid forces them down into the ejector pot. The valve in the pipe is then closed and compressed air admitted into the top of the ejector pot, which forces the semi-liquid screenings out through an ejector outlet into the pressure main. In this way all of the screenings in the suction chamber can be removed in a few minutes.

WALLA WALLA PAVING COSTS.

Since writing the article relative to Walla Walla paving costs in the March 2nd issue, we have received further information from the city engineer Rehorn. He informs us that the excavation is all loam containing more or less gravel and runs quite uniform in character in any one contract. The inlets are always of the same size and shape and require the same amounts of material and the prices complete naturally run uniform.

The specifications provide that excavating soft spots and filling them with gravel is to be paid for extra. But raising or lowering heads of manholes, monuments, etc., to grade is not allowed for extra. The combined curb and gutter bid on is 6 inches thick, both curb and gutter, the gutter is 24 inches wide and the curb 13 inches from top to base, the whole faced with $\frac{3}{4}$ inch of mortar. Plain curb is 14 inches deep, 6 inches wide on top and 8 inches at the bottom.

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for. Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

MARCH 9, 1916

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Pavement Choice Based on Traffic Data.

"A road census will be started immediately, to determine the density of travel and amount of tonnage on each county road. The results of the census will be used to determine what material should be used in the improvement of each road." This statement concerning the activities of St. Louis County, Missouri, made in our issue of last week, would seem to promise a rational expenditure of the three million dollar bond issue which the county has voted for good roads.

There are few road authorities in either city, county or state, who have traffic data to use for this purpose, and still fewer, having these data, make such use of it; and a discouragingly small number even have a desire for such information. There are a number of different kinds of pavement available and numerous variations of several of these kinds (notably bituminous combinations); and it is often said that each of these kinds is the best to use under certain conditions; and in general this is true. A rational choice, therefore, involves an accurate knowledge of the controlling conditions, and a very important one of these is the amount and kind of traffic to be carried. It is easy to see that traffic is a very important question in deciding between, say, stone block and sand-clay. But it is also important in the finer gradations between granite, brick, wood block, sheet asphalt, the various bituminous pavements, surface treatments, etc.; also between no base, macadam base, and 4-, 6-, 8- or 10-inch concrete.

Unfortunately our knowledge of the relation between traffic on the one hand and pavement wear and deprecia-

tion on the other, is in its infancy. There has been plenty of theorizing, but not enough data are available. We have not even agreed generally on what units to employ in collecting the data. The units should be those which will secure a differentiation between conditions which affect the road differently. Among such conditions those generally recognized are whether the vehicles are horse-drawn or motor-driven; the weight on the wheels and the speed (although this is seldom recorded). But the presence and character of dirt on the pavement (which serves as an abrasive agent); the use of chains and the kind of tire surface; whether the vehicles follow one track or scatter over the surface; these as well as the total number of vehicles per day and per year would seem to affect the rate of wear; and there are probably others as well—for instance, the impact of heavy loads as affected by the springs on the truck.

Which of these should be observed, or which can be neglected as of inappreciable effect? And in what terms shall each be recorded? And how can one or two observers secure all these reliably when the traffic is dense? These are some of the questions which must be answered before road engineering can be classed as even approximately an exact science.

It is apparent, therefore, that officials are not so much to blame if they do not base their choice of pavement upon traffic records of the roads in question, since the conclusions to be drawn from such records are not yet well established. The basis for such conclusions can be established only by records of observed relations between phenomena of wear and the traffic conditions which occasioned them.

The condition is similar to that which existed in designing water conduits before formulas and co-efficients were determined for flow in conduits of iron, masonry, earth, etc. A century ago there was no knowledge, even approximate, of the capacity of any sewers, existing or proposed. That this is no longer the case is due to expensive and elaborate tests made by the French government, by French, Swiss and American engineers, by engineering colleges and others. It seems to us that the United States Office of Public Roads could do no better service than to conduct experiments, and secure the co-operation therein of competent road engineers throughout the country, looking to the clearing up of some of these uncertainties, the establishing of standard terms and units for recording traffic; of some definite relations between traffic quantities, traffic wear and pavement characteristics; and the encouraging of all road officials in taking such records.

Unstable Streets.

Paving departments in all cities find their worst troubles occasioned by "wear and tear" on the pavements, and generally the wear presents a less serious problem than the tearing up done by public service companies and departments to lay or reach underground structures. A few cities are confronted with an even more serious cause of street disturbance, which works from below rather than above and causes settlements of the entire street surface, sometimes uniformly and again very irregularly, this disturbance being due to the caving in of mines which have been driven beneath the city or over which the city has been built.

Several cities in the coal regions of Pennsylvania have come to expect occasional settlements of streets and houses due to the caving in of roofs, generally of abandoned workings. Scranton has a "Bureau of Mine Cave Commission," which inspects all coal workings under the city to guard against cave-ins and also takes levels at intervals along streets over such working to detect gradual settlements. The report of this commission for last year with reference to one street showed some settlement

during every month except November and December, and other local settlement were described.

Probably every city engineer feels that he has troubles of his own that others do not appreciate; but we imagine few live in an uncertainty as to whether their benchmarks are stationary, or in which direction the sewage will be flowing in a given sewer next month; and some, reading the above, may be consoled with the thought that there are others who have troubles even more annoying than his own.

CARE OF UNPAVED STREETS.

By W. H. HORNE.

Not the least of municipal problems, even where most of the streets are paved, is the care of those still unpaved. The great amount of traffic passing over these streets makes it harder to care for such thoroughfares than it is to care for country roads.

Of course every road expert will recognize that the first and most essential thing in the care of such a street is to secure a smooth, hard surface, or as smooth and as hard as the character of the soil will permit. There are several factors which tend to make this condition one difficult to maintain. Among them are sand, rain and use.

Living in a section where sand is quite common (Fitzgerald, Ga.) the writer has found that this is a natural condition which must be overcome by the prosaic intervention of manual and mechanical labor. The sand, if there is much sand in the street to be improved, will have to be disposed of either by hauling away until a hard surface is reached, or it will have to be buried beneath a more durable surface of clay hauled in and dumped over it, or mixed with it. It has not been found a good idea in South Georgia, where sand is predominant in the top soil, with a yellow clay subsoil within a foot or two of the surface, to construct a street or roadway of pure clay, for the reason that in wet weather the clay will bog too easily. The presence of sand, in this section at least, is a boon to road builders. A mixture of about one part sand to two parts clay makes a surface sufficiently hard in dry weather, while the intermixture of sand prevents bogging up in wet weather. Much of the territory referred to is composed of soils already prepared in this way by nature, so that road making, under such circumstances, is comparatively easy.

Whether this surface be obtained by natural or artificial means, however, it is found that this kind of soil is more or less "washy." It is found that rains, together with the rough use to which unpaved streets are subjected in the busiest towns, will produce holes and hollows within a very short time. There is no such thing as putting a street in condition once for all, but the question is how to reduce the work to minimum and how to do it in the best and most practicable way possible.

When the street has been washed into gullies or broken by the wheels of vehicles, it is an easy matter to run over the street with a scraper. This fills the hollow places with loose earth scraped away from the higher points, and thus brings the surface to a perfect grade. This makes, when well done, a beautiful, smooth and uniform surface, but the trouble is, will it last? Experience with the kind of soil referred to, at least, demonstrates that it will not. Loose earth of a partly sandy nature does not readily cement together, and when it is piled with the scraper into ruts and cavities, it makes the best kind of a target for gully-washers. The first big rain that follows the scraper will undo half the work.

The remedy involves a great deal of work, but it pays. In a city having several miles of unpaved streets over which the traffic was continuous and heavy, the idea was conceived of breaking the entire street surface just

as if it was a meadow to be prepared for planting. It took a team of six mules to pull one of the big street plows used in breaking the lumpy surface. Each one of these teams could break an equivalent of an acre of surface in one day's time. A street about one hundred feet wide and three-fourths of a mile long was broken in five days by the use of four teams. Two of the teams went ahead with a root plow and ripped up the surface, and two big turn plows came behind and turned the soil over. When this work was done (by sections, of course) each section so prepared was run over and smoothed with the scraper. After the street was smoothed in this way the surface, while not very hard at first, was uniform throughout—no hard places here and soft places there—and it was found that over this surface the rains would trickle or soak in without washing, and after one or two good rains, the surface was as hard as ever. Traffic may be allowed on streets of this character as soon as the scraper has run over and smoothed it, though it is better, if possible, to have a good rain before such use is permitted.

From time to time, of course, this breaking and smoothing will have to be repeated. Meantime, you have a beautiful street and not near so much pottering between times.

It is believed that this method will be found applicable to, and beneficial in, wide stretches of territory throughout the United States where like conditions of soil obtain, and possibly it may be found applicable to different kinds of soils with variations in method to suit the circumstances.

PAVING BY MUNICIPAL FORCES.

Of the eleven hundred cities which furnished the information concerning paving tabulated in our February 3rd issue, 286 stated whether the work was done by contract or by city forces. Of these, 243, or 85% did all paving work by contract; 33, or 11½%, did all by municipal forces; and 10, or 3½%, laid some streets by each method. Massachusetts, Michigan, New York and Pennsylvania cities seemed to do a larger percentage of work by municipal forces than those of most other states.

The accompanying table shows the numbers of cities reporting work done by contract and by municipal force, for each kind of pavement, and the percentage which cities doing municipal work were of all those reporting, for each kind of pavement.

Kind of pavement.	Number of cities reporting paving done by		Percentage municipal is of all.
	Municipal force.	Contract.	
Gravel	22	16	58
Water-bound macadam....	43	32	57
Bituminous macadam....	47	46	51
Stone block.....	21	34	38
Creosoted wood block....	11	41	21
Bituminous concrete.....	12	71	15
Concrete with bit. top....	4	24	14
Asphalt block.....	2	16	11
Concrete	16	129	11
Brick	22	193	10
Sheet asphalt.....	5	76	6
Bitulithic	3	48	6
Totals and average.....	208	726	22½

As would be expected, gravel and plain macadam are most often constructed by municipal forces; but it is surprising to find 38% of the stone block and 21% of the creosoted block so laid. Bituminous macadam is more commonly laid by municipal forces than bituminous concrete, probably because less expensive and special machinery is required. The same reason probably explains why sheet asphalt is so generally laid by contract.

The WEEK'S NEWS

State Highway Developments in Minnesota, California, Missouri and New York—Typhoid, Measles and Scarlet Fever in Many Cities—City and Utility Company in Pasadena, Richmond, Ind., and Springfield, Mo.—The Montreal and the St. Louis Fires—Boston's Segregated Budget—Indebtedness of Philadelphia and California Cities—Race Segregation in St. Louis—The Harbor of Los Angeles.

ROADS AND PAVEMENTS

Minnesota Road Funds.

Minneapolis, Minn.—The state highway commission will have \$1,418,500 to spend on roads and bridges in Minnesota this year. This is based on the statement of estimated receipts into the state road and bridge fund as prepared by the state auditor and submitted to George W. Cooley of the highway commission.

California's \$18,000,000 Highway Work.

Sacramento, Cal.—Between now and December 31st next, the California Highway Commission that has been working during the last few years under the \$18,000,000 bond issue, voted by the state, will have expended its present funds. Further construction will depend on the fate of the \$15,000,000 issue to be voted on in November. With the \$18,000,000 issue a wide cordon of permanent highways has been constructed from north to south, and a large number of gravel or graded roads has been constructed and taken over for maintenance by the commission. In addition, routes for many unconstructed units have been selected and surveys ordered. The remaining funds of the commission will be used in clearing up the work now contracted for, as no more bonds are available for new construction. If the \$15,000,000 issue is passed bonds will be sold and new contracts called for with the idea of rapidly completing all gaps in the trunk lines and constructing all of the needed laterals. No time will be lost in the reassembling of field forces. Since the convict labor system, now under way in Mendocino County between Willits and Cummings, has proved a success, this means of road building will probably be largely employed in the construction of mountain laterals where the cost of the work would be practically prohibitive if done by contract or day labor. The section between Willits and Cummins is one of the most difficult highway routes in California. Engineers have estimated that the work, if done by contract, would have cost over \$20,000 per mile.

Missouri Road Law Upheld.

Jefferson City, Mo.—The Missouri Benefit District Road Law, involving the constitutionality of more than seventy road districts in Missouri, and which, it is said, will make way for permanent road improvement in the state, has been upheld by the supreme court at Washington as constitutional. Roads may now be built like city streets—by creating districts including none but benefited property owners, assessing them in proportion to the benefit they receive and giving them ten years in which to pay. There will now be no obligation to wait on a whole county or township or city to decide to build roads. If a road winds, the district can be made to wind with it. It may be any width or any length, and the vote is by acres, so tenants cannot

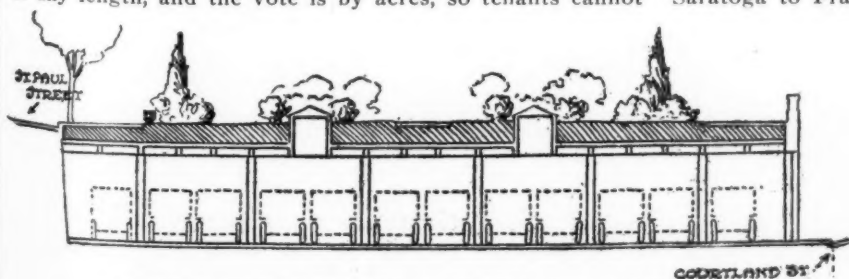
defeat improvements of this kind. Interested property owners and none other have the power to decide. When owners of most of the land involved petition for such a road the county court will submit the matter to the state highway commissioner. If he indorses it, the court will make up a proposal, set a day for objectors, and then if approved, submit the plan. Land within the first half mile of the road will pay 100 per cent; from one-half to one mile, 75 per cent; from one to one and one-half miles, 50 per cent, and over one and one-half miles from the road, 25 per cent of the cost. The case decided was that of the Kansas City-Birmingham-Liberty Boulevard district. In 1912 it was proposed to build a rock road from North Kansas City to Liberty. A benefit district was formed under the law and \$70,000 in bonds voted. Objectors carried the case through circuit, appeal, state supreme and finally to the United States Supreme Court. The decision will also accelerate the building of the National Old Trails Road across Missouri.

Paving in Pennsylvania Cities.

Harrisburg, Pa.—Fourth in population but first in miles of paved streets is the position of Harrisburg among the twenty-eight third class cities of Pennsylvania, according to statistics compiled by J. Herman Knisely, municipal statistician of the State Highway department. With 74.49 miles to its credit, Harrisburg is easily the leader. Erie, larger in size, is the nearest competitor with seven miles less. Wilkes-Barre, also more populous than Harrisburg, is a poor third with forty-six miles. Reading, the largest city of the third class at the last census, has only 24.991 miles. Sheet asphalt cost approximately \$1.80 a square yard. Brick pavement here cost \$1.95 a square yard, comparing favorably with others, for instance, Erie, which paid \$2. Total miles of street paving in other third class cities follow: Allentown, 30; Altoona, 44.56; Beaver Falls, 10.5; Bradford, 14.475; Carbondale, 4.50; Chester, 30; Easton, 8.26; Connellsville, 11.72; Corry, 4.874; DuBois, 7; Franklin, 9.4; Hazelton, 5; Johnstown, 42.5; Lancaster, 7; Lebanon, 2.2; McKeesport, 35.15; Meadville, 16; Monongahela City, 6.87; New Castle, 30; Oil City, 23; Pittston, 7; Titusville, 10.1; Williamsport, 14.97; York, 15.65.

Underground Auto Parking.

Baltimore, Md.—Mayor Preston, Chief Engineer Hendrick and W. W. Emmart, architect of the Municipal Art Society, believe that the problem of automobile parking space downtown can be solved by constructing a tunnel under the proposed St. Paul street park. Mr. Emmart has worked out a plan, as shown in the accompanying cut, whereby 500 automobiles can be stored under the park from Saratoga to Franklin street. The bed of Courtland street is approximately 17 feet lower than St. Paul street, and the entrance to the garage space will be from Courtland street, the front of the underground parking space being supported by heavy concrete arches and the interior by concrete pillars. Mr. Emmart proposes that the buildings on the east side of Courtland street can be reached from the boulevard by erecting bridges from the second floors to the roof of the proposed tunnel.



PROPOSED UNDERGROUND PARKING FOR BALTIMORE.

The New York Highway Department.

Albany, N. Y.—The installation of a prison stone quarry at Great Meadow prison is recommended by Edwin Duffey, state highway commissioner, in his annual report submitted to the legislature. He says such a plant could be erected for \$40,000 and would have a capacity of 500 tons daily and could be used in connection with highway and canal work. "No commercial stone quarry of importance is at present operated in that section of the state," says Mr. Duffey, "and, on the other hand, the state requires for both construction work and maintenance work in that locality a very large quantity of stone annually. If a proper stone crushing plant could be installed it would seem advisable." Mr. Duffey's report shows that all the first \$50,000,000 highway bond issue has been appropriated or obligated by existing contracts and expedited routes. Of the second \$50,000,000 issue, authorized in 1912, there has been appropriated by the legislature \$25,000,000, which leaves a similar amount available for construction work. The recommendation is made that \$10,000,000 be appropriated for 1916, one-half to be made available at once and the other half September 1. Of the designated system of 11,988 miles of state and county highways there are now completed or under contract 7,388 miles. Plans have been made for the construction of highways in every county of the state in 1916, and it is expected that extensive building will be conducted. Mr. Duffey says that the completion of the unbuilt routes can be hastened if the legislature will take steps to make available the expected surplus some counties will have of their apportioned share of the second \$50,000,000. Certain counties which borrowed highway money with the privilege of repaying the state in 50 years are likely to make payments sooner and such funds may become available also. Mr. Duffey also recommends that the legislature provide for a sufficient amount of money to eliminate some of the most dangerous railroad crossings in the state and says that his department will co-operate with the public service commission in this matter.

Strengthens Paving Specifications.

Omaha, Neb.—In the new paving and sewer specifications for this year the city engineering department believes it has opened the field for a greater variety of materials and at the same time has safeguarded the taxpayers. Concrete bases will require a larger proportion of cement. More bitumen will be required in asphaltic concrete pavement. The old specifications covering repaving jobs stated that sufficient concrete should be placed in the base to bring the paving to required grade, which provision was a temptation for contractors to pour in a ten-inch base in places and charge accordingly. The new specifications specify the exact thickness of the base on these repaving jobs. In the construction of curb and gutter the city will require that the mixture shall be uniform and of specified proportions. Considerable trouble has been experienced on account of contractors filling the interior of these curbs and gutters with coarse material, with a surface of finer quality, the result being that the surface frequently cracked and chipped. Contractors will be held to stricter account for the mixing of materials. The field has been opened to concrete pavement with steel reinforcements. Sewer specifications will permit the offering of bids on concrete pipe.

SEWERAGE AND SANITATION

Typhoid Follows Flood.

Chicago, Ill.—Chicago, and especially the district south of Twenty-second street, is threatened with an epidemic of typhoid fever because of the failure of citizens in that part of the city to observe warnings issued by Health Commissioner John Dill Robertson, following the big storm which swept the city causing dangerous floods, filling sewers and contaminating the drinking water in that section. There are now twenty-two cases of typhoid fever in this district and each case has been traced by health inspectors directly to the failure to observe warnings. Vigorous efforts are being made by the department of health to prevent the spread of the disease, but despite the efforts

of inspectors the number of cases have increased. In one day ten cases of typhoid were reported to the health department and seven of these were in the affected district. The day before thirteen cases were reported and the day previous eight cases.

Measles in Pennsylvania Cities.

Allentown, Pa.—State Commissioner of Health Dixon wired Health Officer J. Treichler Butz that on account of the epidemic of measles existing here fifteen schools should be closed and all children under fifteen years old be barred from attending the "movies" or other theatres, the Y. M. C. A., the public library, Sunday schools, churches or any other public places. There are 260 cases of measles in Allentown and 365 cases were reported last month. The orders have been carried out.

Erie, Pa.—Twenty cases of measles reported in one day sent the total to more than 100, according to Dr. J. W. Wright, health officer. A large proportion of the cases are on the east side of the city. Precautionary warnings have been sent out.

State Department Investigates Scarlet Fever.

Peoria, Ill.—Six new cases of scarlet fever reported in the day increased the number in the city to eighty. The disease is slowly but steadily gaining, in spite of the efforts that commissioner Garrett of the health department has made since being appointed head of the health department two months ago. Dr. C. E. Crawford, of the State board of health, came here in response to a letter from health commissioner Garrett, requesting the state department to investigate and if necessary take charge of a situation that seemed beyond control of the local authorities. The scarlet fever began with a few cases last spring, increased to 40 or 50 during the summer, and has raged all fall and winter with 60 to 80 cases usually.

Typhoid in Milwaukee Serious.

Milwaukee, Wis.—At a special meeting of the city council an appropriation of \$10,000 was asked by Dr. G. C. Ruhland, health commissioner, for a campaign against typhoid fever which is spreading throughout the city at an alarming rate. The appropriation was granted for use in employing six physicians and six nurses for vaccination. The number of cases had increased to 206 and the deaths to 10 when Dr. Ruhland asked for the needed money. The city's water is suspected and school fountains and swimming pools have been closed. Warnings have been issued insistently and Mayor Bading, as an example, has had himself vaccinated. Some of the cases, it is said, are due to the use of "spring water" falsely labeled.

Vaccinate 2,000 After Smallpox Cases.

Philadelphia, Pa.—Following discovery of two cases of smallpox, each in a different section of the city, physicians of the bureau of health vaccinated 2,000 persons in two days. The victims were a negro man and woman. The man was employed as a porter and before the nature of his ailment was determined he had visited a motion-picture show and a theater and had ridden in elevated trains. It was necessary to rope off a section about the man's home to vaccinate the residents, 1,200 being vaccinated. The man had visited the woman's house and she was found to be suffering from the disease. In the neighborhood of the woman's residence 800 were vaccinated.

Scarlet Fever Increasing.

Kansas City, Mo.—In three weeks the number of cases of scarlet fever jumped from sixty to 213 cases reported to the health department. The spread of the disease, according to Dr. Paul Paquin, is due largely to the breaking of the quarantine laws. "While we now have only one case of scarlet fever to every 1,768 persons in the city, according to the last directory, the spread of the disease has been greater than it should have been," Dr. Paquin said. "By means of our school inspection we have been able to keep open all of our schools, but it is impossible for this department to inspect every home in the city, and we must depend

almost entirely on the people themselves." Fifty of the scarlet fever cases are in the General Hospital and the other 163 are quarantined. There are eleven cases of measles in the General Hospital and 176 quarantined in homes throughout the city. There are only about a dozen cases of diphtheria now.

Measles in Newark.

Newark, N. J.—A measles epidemic is sweeping all parts of the city, 31 deaths and 1,355 cases being reported between Jan. 1 and Feb. 17, according to figures of Health Officer Charles V. Craster. Between 70 and 100 cases are being reported every day. Vigorous methods of stopping the disease, including the closing of all schools for two weeks, are being discussed by the board of health. Dr. Elmer G. Wherry pointed out that the death rate from measles had more than equaled the combined death rates from diphtheria and scarlet fever in the city last year. Dr. Craster and Dr. Daniel L. McCormick were given full charge of the anti-measles campaign. Following a survey of the Third ward of the city by a local newspaper which exposed vicious sanitary conditions, the board is preparing for a clean-up campaign in which every available inspector and employee of the board will be used.

WATER SUPPLY

Officials in Court in Water Bill Case.

Pittsfield, Mass.—Mayor George W. Faulkner, City Solicitor John J. Whittlesey and Clerk Louis B. Cummings of the board of public works, representing the city of Pittsfield, were haled into court to plead on a complaint which charged that "the city of Pittsfield, a corporation engaged in selling or distributing water to the inhabitants of said Pittsfield, did on Feb. 1 refuse or neglect to furnish or supply water to a building on premises occupied by complainant, for the reason that a water bill remained unpaid by the previous owner or occupant of said building." It is the contention of the public works board that a then occupant of the three-decker building was in arrears as regards water rent and so the water was shut off from the entire building. The water at the house was shut off outside the building, and the complainant was denied the service for only about two days. When the owner was acquainted with the circumstances, he hastened to pay the amount due the city and the service was resumed. The criminal action will not interfere with the plan of the complainant and his counsel to institute civil proceedings in the sum of \$500 for the alleged shutting off of the water. The complainant states that when the water in the house was shut off his wife was ill, and the shutting off was an especially serious matter on that account. He claims that he had paid his water rent up to May 1, 1916, and that the city has committed a legal blunder by what he asserts is an invasion of his rights. City officials hope that out of this process will grow the enactment of an ordinance hereafter compelling the landlord to pay all water rents.

Pipe Layers' Strike to Increase Rates.

Cleveland, O.—When 240 employees in eight waterworks pipe laying gangs laid down their tools, marched to the city hall in a body and sent committees to the offices of Mayor Harry L. Davis and Utilities Director Thomas S. Farrell to demand a boost in pay from \$2 to \$2.50 a day, a long threatened increase in city water rates became almost a certainty. Director Farrell announced he favored the wage boost, and added that this and other increases resulting from establishment of a \$2.50 wage minimum in the department would necessitate an advance in water rates. He said the increases will mean an added expense of at least \$75,000 a year for the water department. That a rise in water rates was inevitable was predicted a year ago when work on the filtration plant was started. Bonds issued for erection of this plant and construction of the new water tunnel have raised the water works debt and necessitated payment of large sums to meet interest charges. The opening of the filtration plant will increase the operating cost. It is claimed the Cleveland water rates are among the low-

est in the United States. On large homes the minimum is \$5 a year. For additional use the charge is 40 cents a thousand cubic feet. If a new rate is adopted a sliding scale similar to that in use in the municipal lighting department will probably be adopted.

Profitable Waterworks.

Vallejo, Cal.—The city of Vallejo made a good investment when it acquired the municipal water system, it is shown by the fact that during the twenty-two years the water system has been in operation it has earned for the municipality a gross profit of almost half a million dollars, the profit from 1893 to June 30, 1915, being \$494,096.08. Consumers have enjoyed a fifty per cent lower water rate than when the Chabot Water Company was furnishing the water. An audit recently completed shows that the assets of the system are \$827,784.69, the fixed capital being \$814,823.25. The first cost in 1893 was \$277,612.64. The income account of the water system from the beginning of operations in 1893 to June 30, 1915, is as follows: Operating revenues, 1893, to June 30, 1915, \$1,032,563.04; less operating expenses, \$277,785.13; net operating revenues, \$754,777.91; add non-operating revenues (rent of land), \$1,177.50. Gross income, \$755,955.41; deduct interest accrued on funded debt, \$268,395.72; less amortization of premium on debt, \$6,536.39, leaving \$261,859.33. Profit, 1893, to June 30, 1915, carried to surplus, \$494,096.08.

STREET LIGHTING AND POWER

Company Opposes Municipal Competition.

Pasadena, Cal.—A new angle has developed in the southern part of the state in the evolution of competition in the public utility field. The city, it is alleged, which owns its light and power plant, has gone out into other territory to compete with a privately owned utility. As a result, the Pacific Light and Power Corporation has filed with the Railroad Commission a complaint against Pasadena. The complaint asks the commission to direct Pasadena to obtain a certificate as a public utility to furnish electricity for light and power in South Pasadena, which is separately incorporated, and to file a schedule of rates to be collected from consumers in South Pasadena. The Pacific company also sells electricity in South Pasadena, and the company asserts that the city of Pasadena is engaged in active competition with it and has taken away many of its customers. It claims to be losing more than \$3,500 a year by this competition.

City Takes Over Electric Plant and Fights Gas Rates.

Richmond, Ind.—The \$80,000 bond issue floated by the city of Richmond to complete the fund necessary for the purchase of the Richmond Light & Power Company's plant has been sold. The city has taken formal possession of the property on March 1, after almost a year of effort to acquire the electric plant. The price to be paid for the plant, \$212,891, was fixed by the public service commission. Richmond is the first city in the state to act under that section of the state utilities law permitting a municipality to acquire a privately owned public utility through condemnation proceedings. The estimated earnings of the plant in private hands last year were about \$17,000.

Meanwhile the hearings in the gas rate case continue with no agreement reached. Chairman Duncan of the Indiana Public Service Commission has suggested that the parties reach a compromise on the question of the company's request for an increase in natural gas rates to 70 cents a thousand cubic feet. The present rate, he thought, is too low. A. C. Howard, gas engineer for the company, submitted his valuation of the property and asked for at least a temporary increase subject to rebate after trial. Mr. Howard put the reproduction value at \$850,000, but in that figure, he said, were some items that were questionable, such as paving over mains. The elimination of these items would bring the real reproduction value down to about \$750,000, he testified. He then said that the value of the manufacturing plant of the company was \$120,000, and that the value of the distribution system was \$365,000. These

figures were given on the tangible property alone, he said, and took no account of overhead costs, going value, buildings, general equipment, real estate and materials and supplies. He testified that he believed the plant was in a "condition value" of approximately 90 per cent. The present value of the property, then, he said, would be about \$750,000, less 10 per cent. Howard testified that the actual price paid by the Richmond company to the natural gas company, which supplies the Richmond mains, was 22.7 cents a thousand cubic feet. The cost to the Richmond company really is higher, he testified, because of the loss occurring between the time the gas is received by the company and the time it is distributed to the individual consumers. The actual cost to the company, a thousand feet, excluding overhead costs, depreciation charges and interest on the investment, he testified, was approximately 36 cents, and the average selling price was about 39 cents. Howard said that he had estimated 3 per cent as a reasonable depreciation charge for the plant. Later in the hearing Mr. Duncan, questioning other commissioners, brought out the fact that in the Evansville gas case the commission allowed 1½ per cent as a reasonable depreciation charge. Howard showed by figures that there was a deficit in the company business of \$6,000, before allowing any return on the investment. Nimrod Johnson, general manager of the company, admitted that the proposed rate of the company would decrease the cost of gas to consumers who average more than 28,000 cubic feet consumption each month, who are approximately one-third of the customers of the company. He said that the proposed higher rate would result in increasing the gas cost to the other two-thirds of the company's consumers.

White Way for East Youngstown.

East Youngstown, O.—The village white way system has been lighted amid the celebration and cheers of its citizens. When the Mahoning and Shenango Railway and Light Company responded to a request of Clerk Anderson every light in the village, with the exception of four, answered the switch and the four miles of lamps blazed out.

Light Rate Adjusted.

Springfield, Mo.—An adjustment of differences between patrons and the lighting company at Springfield has been made by the Missouri Public Service Commission at Jefferson City. The company will charge eight and one-half cents a kilowatt hour for residences and a power rate of three cents. It will dismiss the appeal taken from a ruling of the commission two years ago in which the commission held that a net earning of 7 per cent on its property was a fair basis for rate-making.

FIRE AND POLICE

Big Railroad Station Fire.

Montreal, Canada.—The Bonaventure Station of the Grand Trunk Railroad was destroyed by fire at a loss estimated at \$300,000. The police declared that an investigation indicated that the fire was caused by crossed electric wires, but fire department officials say that the building was destroyed as a result of an enemy plot. The company later issued a statement, declaring the fire was accidental. The flames were first noticed by a policeman on duty near the station. They burst out from a tower in which stationery was stored. Before the fire department could reach the scene the fire had spread with tremendous rapidity to other parts of the structure, which was an old one and largely constructed of wood. The temperature was below zero and the firemen suffered severely.

Two-Platoon System in Referendum.

Newark, N. J.—The two-platoon system for the fire department, as embodied in a bill signed by Governor Fielder, has been indorsed unanimously by the finance committee of the common council, and a resolution was adopted providing that the matter come up as a referendum at the next general election, in accordance with the legislative provisions of the new act. The executive committee of the Firemen's Benevolent Association is preparing to start a campaign in the city explaining what the law means. The

members of the latter association, which includes practically all the officers and men of the department, will attempt to interest the clergymen of the city in the project on the grounds that the bill will be beneficial to the home life of the firemen by allowing them time with their families and will also permit fuller attendance upon their religious duties. The bill provides generally for a two-platoon system, which will have the men serve on an average of twelve hours a day in a week of seven days, instead of one day off in six, under the present system, with twenty-four hours' duty for the days on. The system, if adopted, would call for the appointment of about 100 additional firemen and result in an additional expenditure for the department of about \$100,000 for the first year. The argument of the firemen is that they have no time for domestic life, that they are on duty twenty-four hours a day, five days out of each six, less three hours a day allowed for meals. These meal times, they point out, they are often deprived of because of fires. As an argument in favor of the law, the firemen say that the fire underwriters in 1914 reduced premiums twenty-five per cent in this city because of the efficiency of the department, saving the citizens something like \$150,000 a year. As an evidence of overwork, the firemen call attention to the big storm of March, 1914, when they were on duty continuously for thirty-one days, and for two days went without even their meal time. They also point out that under the proposed system they do not have meal time, so that they do actually twelve hours duty a day.

Dynamite Wrecks Houses.

St. Louis, Mo.—Two persons were killed and about twenty injured, seven seriously, when five cases of dynamite stored in a small building for use in sewer construction work exploded in Maplewood, a suburb of about 5,000 inhabitants, southwest of St. Louis. Thirty houses were demolished and many others damaged. First reports were that the explosion had resulted in an appalling loss of life. Ambulances and patrol wagons in St. Louis and four fire companies were rushed to Maplewood. The cause of the explosion is being investigated by city officials.

GOVERNMENT AND FINANCE

Segregated Budget in Boston.

Boston, Mass.—For the first time in the history of the city the city council received for deliberation a segregated budget showing in studied detail how it is proposed to spend \$15,000,000 for department maintenance during the year. Only one city department declined to submit a segregated budget, according to the demands of the newly established system. The Public Library trustees submitted their estimates for salaries in a lump sum. There is confidence in the city council that the segregated budget system will prove the success that its proponents claim for it, but the departments have not the same feeling. The mayor, in his message to the council transmitting the budget, warns against further reductions, believing that municipal efficiency would be impaired by closer paring. He also tells the council that the public works department has been preparing a comprehensive programme for street construction, and that his bill before the legislature, seeking the authority to add fifty cents for the next five years, to the amount now authorized within the tax limit, should have the support of the council. The estimates call for \$2,000,000 more than is allocated by law and the mayor has cut them down by that amount. As a reason for supporting the plans of the public works department, Mayor Curley says: "It is accepted that in everything save decent streets, Boston is in the forefront of American municipalities, and it is the sincere desire of every citizen interested in the welfare of the municipality that a definite programme be shortly established and rigidly followed with reference to the construction of thoroughfares that will be sanitary and durable." The budget carries a total for city and county expenses of \$23,657,531.71, or an increase of \$561,629.53 over the total granted last year. The budget, therefore, is larger than ever before. For departments under the mayor's control, \$15,141,801.39 is asked, this sum being

\$608,000 more than was requested last year and nearly \$1,000,000 more than the council allowed. There are 3,602 items in the budget, the largest number being in the hospital department and the second largest number in the fire department. A departure is made from established form by including appropriations of \$1,300,000 for self-supporting departments, such as the City Record, the water income division of the public works department and the printing department. The income from these departments will be turned into the city treasury, instead of allowed to be used as the department funds. The expenditures of the fire and police departments combined is this year nearly one-third of the total amount that may be appropriated within the tax limit, and the amount necessary for schools represents about forty per cent of the total amount that may be raised on each one thousand dollars of valuation exclusive of income.

Population of Commission Cities.

Washington, D. C.—Among the cities of the United States having populations between 30,000 and 500,000 the United States Bureau of the Census has found that 41 per cent of the total number of persons represented are under the commission form of government. The bureau has prepared special financial statistics for 24 selected cities—8 having had the council form of government during the fiscal years 1913 and 1915, the commission form having been in use in 8 others, and another group of 8 having had the council form in 1913 and the commission form in 1915.

Tax Commission Appointed.

Pittsburgh, Pa.—The Pittsburgh Tax Commission, a body of fifteen citizens chosen to study the tax laws and to recommend some plans for "distributing the burden equitably," has been appointed by Mayor Joseph G. Armstrong, Controller E. S. Morrow and President of Council J. P. Kerr. The commission is composed of the following: Dr. J. T. Holdsworth, dean of the School of Economics, University of Pittsburgh; Herbert L. May, Allan H. Willett, dean of the School of Economics, Carnegie Institute of Technology; W. H. Walker, dean of the School of Economics, Duquesne University; W. D. George, Henry P. Haas, Eugene S. Reilly, John Walker, William J. Kelly, S. P. Trimble, John Dimling, George Seebick, Henry A. Phillips, Wilson A. Shaw and William Price. The first suggestion for a tax commission was made several weeks ago by the Real Estate Board, which proposed that the mayor make the appointments, council finally agreeing upon the plan of having the commission selected by three men, representing the executive and legislative branches of the city government.

Governor Appoints Boom City Administrators.

Richmond, Va.—Governor Stuart has named the following five administrators for the city of Hopewell, to remain in office until July 1, when a mayor and city council will be appointed by the governor to serve for four and two years respectively: Benjamin J. Harrison, Richard Epes, M. A. Flynn, J. O. Faison and Richard Boisseau. This appointment is a complete victory for that faction in Hopewell which has been opposing the efforts of politicians to secure control of the government of the prospective new city. Governor Stuart had before him for his signature a bill enacted by the State General Assembly granting a charter for the incorporation of Hopewell as a city of the first-class. Citizens of the town decided to ask the legislature for a charter after the fire which swept out most of the place several months ago. Since then Hopewell has been practically rebuilt. Hopewell, which sprang up last summer after the duPont de Nemours Powder Company erected a guncotton factory there, has a population of 20,000.

Philadelphia's Borrowing Capacity.

Philadelphia, Pa.—An investigation which Mayor Smith caused to be made concerning the city's financial condition, indicates that in the aggregate there is a borrowing capacity of possibly 85,606,038. The mayor desired the information before taking steps in floating a big loan for permanent improvements. The investigation has been in the hands of

city solicitor Connelly and city controller Walton. Under a decision of the supreme court the final cost of any improvement sanctioned by councils must be considered as a debt against the borrowing capacity, whether or not the improvement is completed. In computing the city's outstanding obligations, Mr. Connelly includes all such improvements, and found that the outstanding obligations amount to \$30,685,169.63. This includes the remaining cost of the Parkway, about \$10,000,000. Originally Mayor Smith and Chairman Gaffney, of councils' finance committee, planned two loans, a councilmanic loan and a permanent loan for a very much greater amount. It has been decided to abandon the councilmanic loan. The apparent borrowing capacity of \$74,000,000 cannot all be employed for general purposes. About \$61,000,000 of it can be utilized only for transit, port improvement, or reclamation of land. This leaves about \$13,000,000 available for general purposes.

City Indebtedness in California.

Sacramento, Cal.—California cities have issued \$210,576,130.95 in bonds, according to figures given out by state controller Chambers, and are paying interest on \$129,059,913.90. The remaining \$63,547,460 consists of bonds unsold or those sold and later called in and canceled. Even \$210,000,000 does not represent the total of California cities' bonded indebtedness, however, according to Chambers. Issues which have been entirely canceled are not included in the data. The records for the fiscal year of 1914-15 show that the bond issues submitted to the people that year, and which were voted down, totaled \$2,552,500. Of the 238 incorporated cities of California, 198 have bonded debts, running from comparatively small sums to large totals. Previous to 1900 nearly all the bond issues were upon a 6 per cent basis; from 1900 to 1907, the rate ran 4, 4½ and 5 per cent, and from that year to date the rate has been from 4½ to 5 per cent. The highest rate found was for a levee bond issue by the city of Marysville, in 1876, at 8 per cent. The amount originally authorized was \$58,000, and of this sum \$3,500 still remains unpaid. In a recent report Controller Chambers stated that the bonded debt of the counties of California amounted to \$61,101,400, and that of the districts to \$31,364,691. The annual interest paid by the counties is \$2,669,674 and by the districts \$1,378,126.

MISCELLANEOUS

Cities Must Come Under Compensation Act.

Butte, Mont.—The Supreme Court has held that all municipalities are bound to come under the provisions of plan 3 of the workmen's compensation act, as well as its employes engaged in hazardous occupations, and that they have been bound since July 1. The opinion, written by associate justice William Holloway, reverses the judgment of the district court at Butte, in the case of Hugh Smith, an employe of the city of Butte, who was injured July 6, 1915. He applied for compensation. The industrial accident board rejected his claim because the city had not elected to be bound by the act. The district court sustained the action of the board. The Supreme Court says: "Section 3 (e) carves out of the general class all public corporations acting as employers, so that the act in its entirety is elective to all private employers, but compulsory as to public corporations and contractors engaged in the performance of contract work for such public corporations. The city of Butte had no election, but was bound by the act, as was its employe, from the time it became effective, July 1, 1915."

Segregation Approved in St. Louis.

St. Louis, Mo.—Returns from the election show that both the ordinances proposing segregation of negroes have been carried by a majority of 34,344, the vote being 112,220 for segregation and 77,876 against. The two propositions voted upon were similar in character. One of the ordinances provides that a negro or white may not become a resident in a block occupied entirely by those of the opposite color. The other imposes the same restrictions in

blocks containing 75 per cent white or the like percentage of negro residents. As both ordinances are adopted, the second, being the more stringent of the two, will be effective. Neither ordinance puts any restrictions on the ownership of property, but restricts solely the use of property for residence purposes. Negroes who are employed in houses or apartments occupied by white persons are unaffected by the ordinances. Apartment house janitors who live in the basements of apartments occupied by whites will not be affected. Both ordinances contain clauses providing that the proposed laws shall not affect persons at present living in blocks occupied by members of the other races. Under the more stringent or "75 per cent measure" only about 150 blocks will be available for negro residences.

City Plan Commission Appointed.

Toledo, O.—Mayor Milroy has appointed a city plan commission consisting of Edward L. Libbey, president of the Libbey Glass Co., five years; Albert J. Eggleston, insurance and real estate man, four years; Joseph L. Tillman, president of the Atlas Laundry & Dry Cleaning Co., three years; John F. Jones, of the Central Labor Union, two years; Paul Arthur Harsch, of the E. H. Close Co., one year. The plan commissioners serve without pay, but the charter authorizes the city council to provide for the expenses of the commission. Also, by charter provision, the director of public service is authorized to appoint a member of his department as secretary to the commission. Duties of the commission are defined in Section 190 of the charter, as follows: "The city plan commission shall have power to control the design and location of works of art which are, or may become, the property of the city; the plan, design and location of public buildings, harbors, bridges, viaducts, street fixtures and other structures and appurtenances having to do with the beauty and convenience of the city; the removal, relocation, extension and platting of streets, parks and other public places, and of new areas; and the preparation of plans for the future physical development of the city."

Pittsburgh Resigns "Smoky City" Title.

Pittsburgh, Pa.—Pittsburgh, after years of study and the expenditure of many hundreds of thousands of dollars, has partially eliminated the smoke evil. Pittsburgh, it claims, cannot longer be truthfully called "The Smoky City." The Mellon Institute and the Industrial Development Commission are continually furnishing to other communities, which are following Pittsburgh, data on the methods employed here to master the problem of smoke. The atmosphere in Pittsburgh is so clear now that the Industrial Commission is being urged to re-write the old name given the city and call it "The Smokeless City." But once or twice during this winter Pittsburgh has been enveloped in its well-known fogs. Even the fogs have been thinned out, however, by the reduction of the volume of smoke and are not so thick and so suffocating as in other years. The city of Pittsburgh lies in a great bowl, the sides of which are the surrounding hills—the outlets being the three river valleys. The fog comes after two or three windless days. Moisture, rising from the rivers, mingles with smoke and, hemmed in by the wall of surrounding hills, blankets the city. The accompanying photograph shows Fifth avenue on a February forenoon. The plate was exposed for about ten minutes. Although thousands of persons passed in front of the camera not one is visible, except a few who stood on the curb at the intersection of Market street,

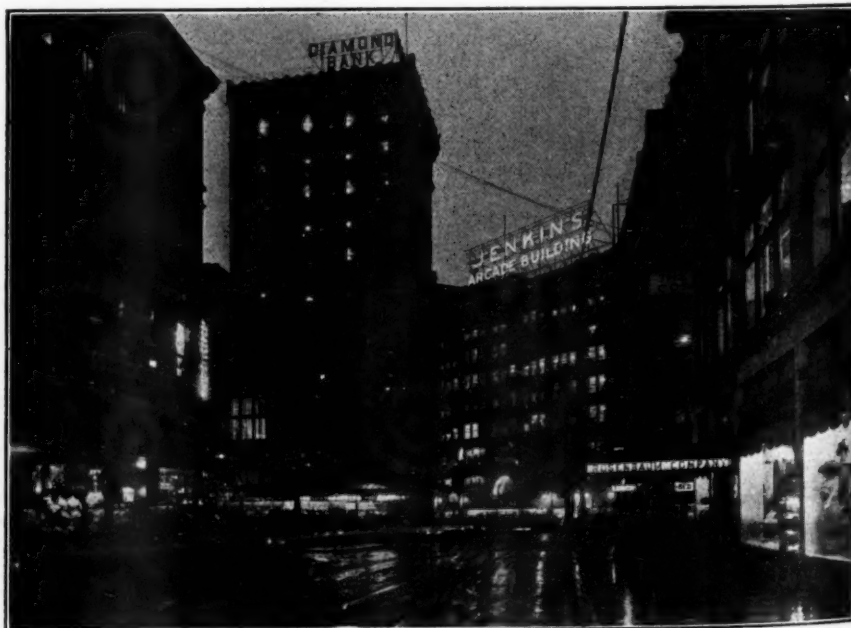
waiting for the street cars that, on such days, crawl through the streets. These days are marked by numerous accidents on train and trolley lines—one of the many indirect hazards involved in Pittsburgh's smoke problem.

Port Improvements at Chattanooga.

Chattanooga, Tenn.—The city commission has been asked to improve wharf conditions and has employed river engineers to work out plans and estimates for improvements to meet the needs of the next fifteen years. The wharf area will be repaved and a modern freight handling system installed. While the agitation on the part of commercial interests has been insistent for a long time the city commission nevertheless feels that the problem should not be entered into hurriedly and without proper study.

City Wins Title to Harbor.

Los Angeles, Cal.—The Supreme Court at Washington has upheld the claim of the state of California to title to the so-called Phineas Banning tideland in the inner harbor of San Pedro. The decision is the final step in clearing the title of the city of Los Angeles to the Los Angeles harbor, according to James A. Anderson, special harbor counsel, and Clarence H. Matson, secretary of the harbor commission. The Banning case is the last of the famous tidelands cases that were appealed to the Supreme Court. In sustaining the title of the state the United States Supreme Court upholds the validity of the city's claim to the tidelands, as the city received title from the state by act of legislature in 1911. The area of tidelands involved is approximately 450 acres, and their value is enormous, although at present not determined, except by the leasing value placed on adjacent areas, where big ship lines are now, or will soon be, operating wharves, paying the city many thousands of dollars a year for the privilege. The Banning case was brought by the city, in the name of the state of California, in which title then rested, with the assistance of the attorney-general, in 1908. The Banning claim was based on old grants for agricultural purposes of lands abutting on, or adjacent to the tidelands embraced in the Wilmington basin. The decision of the courts has been uniformly that the tidelands, suitable for uses of commerce and navigation, are vested in the state, and not the holder of the adjacent agricultural lands. The state legislature in 1911 by special act transferred title to the city of Los Angeles in the lands involved in all the harbor tidelands suits. The city has won in all the suits appealed to the higher courts, just as it won in the lower courts in all suits brought. The city can now go ahead with the development of the tidelands.



Courtesy, Pittsburgh (Pa.) Industrial Development Commission.
A PITTSBURGH FORENOON.

LEGAL NEWS

A Summary and Notes of Recent Decisions—
Rulings of Interest to Municipalities

Streets—Defects—Liability.

Seagraves v. City of Winston et al.—A city which permitted an excavation across a sidewalk two feet in depth and which failed to properly light or protect it was negligent and liable in damages to plaintiff, a pedestrian who, in the early evening, fell into it and was injured.—Supreme Court of North Carolina, 87 S. E. R., 507.

Officers—Liabilities of Sureties.

Brown et al v. City of Amarillo.—Where a city secretary and treasurer executed separate bonds as secretary and as treasurer, if he as treasurer permitted himself as secretary to receive and retain as commissions an amount to which he was not entitled, the treasurer and his bondsmen were liable, as he as secretary necessarily received and retained the money from himself as treasurer, and as treasurer he had no lawful justification for permitting this.—Court of Civil Appeals of Texas, Amarillo, 180 S. W. R., 654.

Dedication—Rejection—Estoppel.

Board of Trustees of Philadelphia Museums v. Trustees of University of Pennsylvania et al.—Where a city by ordinance set apart certain land to be improved for the health and public welfare of its citizens, and in such ordinance recited that the land was to be used as a public park and for the construction of museum buildings and a botanical and economic garden, and appropriated funds to care for and improve the land and buildings, there was such a complete dedication and acceptance for public use as estopped the city from interfering with or revoking the grant.—Supreme Court of Philadelphia, 96 A. R., 123.

Contractor's Bond—Rights of Sub-Contractor.

Streator Clay Mfg. Co. v. Henning-Vineyard Co. et al.—The contractor for the construction of sewers, etc., agreed to pay for all material used which might become a lien, and furnished a surety company's bond to perform his contract. Plaintiff, a sub-contractor, furnished materials, but did not perfect his lien under Code, § 3102. Section 3104 provides that the contractor may prevent the filing of such claims by filing a bond conditioned to pay claimants, on which actions may be brought by claimants, and section 3467 authorizes actions on a bond to a municipal corporation, etc., to be sued on by any person intended to be secured thereby. Held, that the bond was a contract for the benefit not only of the town, but of the sub-contractor, who might sue upon it to enforce payment of his claim, though he had not perfected his lien.—Supreme Court of Iowa, 155 N. W. R., 1001.

Streets—Title of Abutting Owner—Abandonment.

Smith v. Horn.—Where the owner of land has it surveyed, mapped, and platted, showing subdivisions thereof, with spaces for intervening streets or other highways between the subdivisions clearly indicated upon the map or plat, and conveyances in fee of the subdivisions are made with reference to such map or plat, the owner thereby evinces an intention to dedicate an easement in the streets or other highways to the public use as such, the title to the land under the street remaining in the owner or his grantees; and, where such conveyances are made with reference to the map or plat, the dedication of the easement for street purposes cannot be subsequently revoked as against the grantees, and the title of the grantees of subdivisions abutting on such streets, in the absence of a contrary showing, extends to the center of such highway subject to the public easement. And, where the highway is lawfully surrendered, the then holder of the title to abutting property and to the center of the street has the property relieved of the public easement.—Supreme Court of Florida, 70 S. R., 435.

Police Power—Regulation of Buildings—Method of Exercise.

State v. Gitchell.—Since the power of a city council to regulate buildings is impliedly to be exercised by a majority vote, an ordinance requiring a two-thirds vote for the issuance of a building permit upon which the building inspector has reported adversely, while on a favorable report a majority vote is made to suffice, is void as to that requirement.—Supreme Court of Vermont, 96 A. R., 383.

Imposing License Taxes—Delegation of Power.

Armour & Co. v. City of Richmond.—Where a city ordinance attempted to impose a license tax upon certain occupations, naming some of them, and upon such others as the finance committee should deem impossible of taxation under the ad valorem system, the ordinance was void in so far as it attempted to authorize the determination of the objects of the taxation by the finance committee, and a tax sought to be imposed under its determination was invalid.—Supreme Court of Appeals of Virginia, 87 S. E. R., 609.

Constitutionality of Licenses—Equality and Uniformity.

Lillard v. Metton et al.—29 St. at Large, p. 493, imposing a license fee on all resident owners of horse-drawn vehicles, automobiles, etc., graduated according to horse-power, does not violate the equality or uniformity clauses of the Constitution because of the method of apportioning the tax, as the apportionment on the basis of horse-power has a direct and natural relation to the privilege of using the highway, and since the license relates to all persons in a class, and operates uniformly on all therein, there is no unlawful discrimination.—Supreme Court of South Carolina, 87 S. E. R., 421.

Expenditures—Authority—Constitutional Provisions.

City of Sacramento et al v. Adams, City Auditor.—The expenditure of municipal funds or property and the right to tax property owners in a municipality for other than strictly municipal purposes, even though for some other public purpose, is not to be taken as authorized unless the power is clearly and unmistakably conferred on the municipality, but the state may confer such power as to any purpose which is fairly a public purpose, of benefit to the municipality, and, under the Constitution, such power may be converted by express provision in a freeholders' charter, or by Legislature directly where the city is operating under general laws, or where there is nothing in the freeholders' charter prohibiting it.—Supreme Court of California, 153 P. R., 908.

Special Assessments—Validity—Relief.

Wood v. City of Peoria et al.—Where a municipality levied a special assessment upon property on which the owner had resided for 23 years, giving her no notice of such levy, because the superintendent of special assessments mailed notice to her address as shown in the assessment roll, which was incorrect, the owner, in her suit to enjoin such assessment, could attack the finding of the county court in the assessment proceedings that notice of the assessment was mailed to the owner paying the taxes on the land affected in the proceeding the preceding year at her residence as shown by the assessment roll, since it was not a contradiction of the finding to allege and prove that the place shown by the assessment roll had never been the owner's residence, so that the rule that a finding of fact cannot be collaterally attacked, unless impeached or contradicted by the record, had no application, while it is the rule that a court of equity will relieve from the effects of a false return of an officer, and that a judgment obtained by means of such return, without notice to defendant, will be set aside, absent rights acquired by third persons; Local Improvement Act, § 41 (Hurd's Rev. St. 1913, c. 24, § 547), providing that the report and affidavit of the superintendent of special assessment shall be conclusive evidence for the purpose of proceeding, not having been intended to preclude relief to an injured property owner by providing that an affidavit which might be false should be conclusively regarded as true.—Supreme Court of Illinois, 110 N. E. R., 802.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to date on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Roads and Streets:

The Old National Road in Pennsylvania. Gives history of famous road. By John Russell Wilson. 7 ills. Good Roads. February 5. 10 cts.

Millions for West Virginia Roads. Kanawha County and its county seat, Charleston, are expending \$2,500,000 for modern roads and streets. 5 ills. 3,000 words. Manufacturers' Record. February 17. 15 cts.

Pittsburgh's Streets. Describes organization of the department, work done during the year and the work projected; grade crossing elimination. 12 ills. 7,600 words. Good Roads. February 5. 10 cts.

Paving Statistics of American Cities. Compiled from information relative to more than 1,200 cities. Furnished to Municipal Journal especially for these tables. Gives amount, kind and cost of roadway and sidewalk paving done during 1915. 36 pages. Municipal Journal. February 3. 50 cts.

Paving in San Antonio, Texas. How the city is spending one and a half million dollars in laying wood block, brick, bitulithic, rock asphalt, bituminous concrete, vibrolithic and cement concrete pavements. By E. A. Kingsley, Consulting Engineer for the city. 7 ills. 4,250 words. Municipal Journal. February 3. 50 cts.

Street Widening in San Antonio. Nearly half million dollars spent in widening a main business street. Large buildings were either cut back or moved back. Part of the cost was paid by property owners. By E. A. Kingsley, Consulting Engineer. 3 ills. 1,000 words. Municipal Journal. February 24. 10 cts.

State: Mississippi's Finest Roads. Describes the work of reconstructing and rebuilding roads throughout Mississippi. By E. R. Thomas, Engineer, Warren County. 5 ills. 1,000 words. Southern Good Roads. February. 10 cts.

Highway Work in Canada. A review of recent progress in highway improvements throughout the various provinces and some notes as to contemplated work. 1,000 words. Canadian Engineer. February 3. 15 cts.

Organization of the Illinois State Highway Department. By W. W. Marr, State Highway Engineer. 1 ill. 1,200 words. Good Roads. February 5. 10 cts.

Highway System of Pennsylvania. Describes the work and organization of the state highway department. 5 ills. 5,500 words. Good Roads. February 5. 10 cts.

Convict Labor:

Convicts Build Mountain Highways in California. Two camps of 61 men each have been at work since last September. 1,200 words. Engineering Record. February 19. 10 cts.

Construction:

Diagonal Thorofares. One of a series of articles on practical street construction. This treats of oblique angles desirable for certain classes of stores and residences and cites examples from several cities. 8 ills. 1,000 words. Municipal Journal. February 10. 10 cts.

Planning Thorofares. This article considers the selection of special streets for this service. Duplicate or parallel thorofares. Grades, side-hill and pedestrian thorofares. 7 ills. 3,000 words. Municipal Journal. February 17. 10 cts.

Planning Thorofares. One of a series of articles on practical street construction. Considers provisions for pedestrian traffic. Squares at traffic centers. Opening new thorofares. 4 ills. 1,500 words. Municipal Journal. February 24. 10 cts.

Advanced Practice With Economical Results on the Allentown-Easton Road. Describes method of mixing and placing concrete, draining road and preparing sub-grade. 9 ills. 2,000 words. Concrete. February. 15 cts.

Construction Methods on the Toronto and Hamilton Highway. Describes the highway and methods used in the construction. Also describes the material yards and transportation plant. By H. S. Van Scoyoc. 7 ills. 1,800 words. Canadian Engineer. February 24. 15 cts.

Example of Modern Practice in Road Improvement; Fayette County, Ky. Describes the use of motor trucks, trailers and gravity loading. 3 ills. 1,000 words. Engineering and Contracting. January 5. 10 cts.

Road Construction as Governed by Traffic Requirements. A paper discussing the details of road construction which are affected by the kind of traffic which the road is expected to bear. By R. C. Muir. 2,600 words. Canadian Engineer. February 17. 15 cts.

Asphalt:

Asphalt Top for Old Brick Pavement. 2 ills. 1,500 words. Municipal Engineering. February. 25 cts.

Municipal Asphalt Repairs in Scranton. Motor-driven asphalt plant and work performed with it in 8 months of 1915. Itemized cost of work is given. Forms for plant and street costs. Use of surface heater. By John G. Hayes, Director of Public Works. 8 ills. 3,500 words. Municipal Journal. February 3. 50 cts.

Bituminous:

Bituminous-Carpeted Concrete Roads of New Type. Describes a Hassam road of new and patented construction. 3 ills. 800 words. Engineering News. February 10. 15 cts.

Essential Physical Properties of Sand, Gravel, Slag and Broken Stone for Use in Bituminous Pavements. Analysis of mineral aggregates as to shape, size, wear resisting qualities, etc. 4,200 words. Canadian Engineer. February 10. 15 cts.

Limitations of Results of Tests of Bituminous Materials. Describes tests for specific gravity, flash point, penetration, ductivity, cementitiousness, and other qualities. Shows methods and instruments used and discusses the limitations of results of these tests. By C. N. Forrest. 2 ills. 4,000 words. Canadian Engineer. February 24. 15 cts.

New Bituminous Pavement. Addition of certain mineral salts to asphalt claimed to strengthen and toughen it. Any inorganic soil material used for aggregate. 5 ills., 1,800 words. Municipal Journal. February 3. 50 cts.

Brick:

Methods of Brick Pavement Construction. Recent development of the monolithic type and a mortar or cement-sand cushion. Also gives the opinions of various engineers. 8 ills. 8,500 words. Good Roads. February 5. 10 cts.

Concrete:

Resurfacing with Concrete. A letter from an engineer describing methods used in small cities in the middle west. 1 ill., 1,200 words. Municipal Journal. February 24. 10 cts.

Gives Cost Analysis of Double Course Pavement. Construction details and inspection methods are given for 6-in. concrete pavement at Tonawanda, N. Y. By A. F. Comstock. 800 words. Engineering Record. February 5. 10 cts.

Tar-Coated Concrete Pavement at Ann Arbor, Mich. Origin and local development of carpeted concrete road. Effects of reducing first cost. By Manly Osgood, City Engineer. 2,400 words. Engineering News. February 24. 15 cts.

Concrete Road Conference Adopts Code of Recommended Practice. Formulates standards covering briefly the main features in every branch of concrete road construction from drainage and grading to finishing. 3,300 words. Engineering Record. February 26. 10 cts.

Smooth Concrete Roads Produced by Accurate Headers. Study of slight irregularities in California pavement directs attention to need for screening surface at true grade. 3 ills., 1,000 words. Engineering Record. February 12. 10 cts.

Concrete Road Building Methods Yield Profits in Cash Instead of in Plant. Contractor reduces labor cost by mechanical handling of materials used on New York state highways. By H. E. Breed. 5 ills., 1,500 words. Engineering Record. February 12. 10 cts.

Good Practice in Concrete Road Construction. The report of the Second National Conference on Concrete Road Building. 3,000 words. Engineering and Contracting. February 23. 10 cts.

Methods and Costs of Constructing Concrete Pavement at Tonawanda, N. Y. Describes conditions and methods of work and gives costs. By A. F. Comstock. 2,700 words. Engineering and Contracting. February 9. 10 cts.

Granite:

Improved Granite Block Pavements. The sixth in a series of articles on factors in the success or failure of street pavements. By Z. W. Carter, Secy. Granite Paving Block Manufacturers' Association. 5 ills., 2,500 words. The American City. February. 35 cts.

Macadam:

Penetration Macadam Roads. Kind and sizes of stone and thickness of courses. Essential characteristics of the bitumen used. Construction methods. 2,500 words. Municipal Journal. February 17. 10 cts.

Methods of Remedying Slipperiness on Surface Treated Macadam Roads. Sanding; tar, sand and gravel; material not slippery; separate roadway. By B. P. Harrison. 1,250 words. Engineering and Contracting. February 16. 10 cts.

Oiling:

Massachusetts Sand and Oil Road Experience. Details of highway practice in one type of road. By W. R. Farrington. 1,800 words. Engineering News. February 17. 15 cts.

Method of Constructing Sand and Oil Roads by the Layer Methods. By W. R. Farrington. 800 words. Engineering and Contracting. February 16. 10 cts.

Oiling Earth Roads. Purpose and importance of oiling; preparation of road surface; oil application, heating, pumping and handling; cost. From a paper by B. H. Flepmeier. 3,700 words. Canadian Engineer. February 3. 15 cts.

Wood Block:

Causes of Failure in Creosoted Wood Block Pavements. Abstract of investigations by Doctor Herbert Von Schrenck, which resulted in changes in wood block specifications. 7 ills., 1,800 words. Engineering News. February 3. 15 cts.

Miscellaneous:

Main Street Subway, Moncton, N. B. Notes on recently completed improvement; design and construction. 3 ills., 1,000 words. Canadian Engineer. February 10. 15 cts.

Toronto Eliminates Dangerous Crossings. Description of work by which danger points have been abolished. By M. A. Stewart, Roadway Engineer. Dependable Highways. February. 10 cts. 2 ills., 1,000 words.

Pitch Sand Mastic Filler. For stone block and brick pavements. Mixed in concrete mixers. Fineness of sand and mixing temperature important. By J. S. Crandell. 3 ills., 1,500 words. Municipal Journal. February 24. 10 cts.

Methods of Applying Bituminous Mastic Filler for Block Pavement. Discusses common methods and illustrates and describes methods in use in Cleveland. By J. S. Crandell. 4 ills., 1,700 words. Engineering and Contracting. February 16. 10 cts.

Regrading a Tunnel Street. Description of work at Los Angeles, Cal., where tunnel was lowered 20 feet at one end and 3 feet at the other. By C. L. Edholm. 2 ills., 1,000 words. Municipal Journal. February 17. 10 cts.

Reclaiming Stone from Old Macadam for Concrete Base. Describes and illustrates procedure on recent Chicago repaving jobs. By Stanley E. Bates. 4 ills.

1,700 words. Engineering and Contracting, February 9. 10 cts.

The History and Economics of Guaranties of Pavement on State and Municipal Highways. From a paper by George C. Warren. 9,000 words. Pacific Municipalities, February. 25 cts.

Standard Analysis of Tests of Non-bituminous Road Material. Outlines analyses and tests and gives recommended methods. Summary of report of committee of A. S. C. E. 4,350 words. Engineering and Contracting, February 2. 10 cts.

Crescoting Plant at Orrville, O. Has Vertical Cylinders for Wood Blocks. A comparatively new idea is believed to have many points in its favor, economizing in first cost, labor and space. By E. A. Sterling. 2 ills., 1,500 words. Engineering Record, February 26. 10 cts.

The Strength of Highway Surfacing. Describes tests; also describes new and less expensive method of constructing brick pavements. By C. A. Newhall. 2 ills., 1,200 words. Pacific Builder and Engineer, January. 15 cts.

Pavement Costs. Editorial discussion on cost figures taken from tables of paving statistics. No uniform practice among cities. 1,000 words. Municipal Journal, February 3. 50 cts.

SEWERAGE AND SANITATION.

Treatment:

Summary and Latest Results of Experimental Work on Activated Sludge at Milwaukee. Summarizes the result and discusses diffusion of air, volume of air, effect of cold weather, etc. By T. C. Hatton. 7,500 words. Engineering and Contracting, February 2. 10 cts.

Activated Sludge Experiments at Milwaukee. A number of activated sludge tanks of different designs have been operated by various methods with such promising results that a start has been made on the construction of a 1,000,000 gallon plant. By T. C. Hatton. 2,300 words. Engineering News, February 10. 15 cts.

Activated Sludge Experiments at Milwaukee. In this article the varied and extended studies of the activated sludge process of sewage treatment conducted during the past year are summarized and conclusion drawn. Second article. By T. C. Hatton. 3,500 words. Engineering News, February 17. 15 cts.

The Activated-Sludge Process of Sewage Purification. Describes results obtained with various types of sewages and recent developments of the process. By G. J. Fowler. 8,000 words. The Surveyor, February 4. 40 cts.

Activated Sludge Method in England. Recent experiments in this method of treating sewage at Salford, England. Duration of aeration, winter operation and possibility of continuous flow. 1,750 words. Municipal Journal, February 10. 10 cts.

Hydrolytic Sewage Settling Tanks at Luton. Describes works constructed for removing most of the solids in suspension from the sewage. The tanks are circular, and are divided into numerous compartments. By J. W. Tomlinson. 2 ills., 1,000 words. The Surveyor, February 4. 10 cts.

Largest Imhoff Tank Plant Nearly Ready to Treat Rochester's Sewage. Concrete construction is finished on six detritus tanks and ten sedimentation units having exceptional sludge storage capacity. By C. Arthur Poole. 10 ills., 4,000 words. Engineering Record, February 12. 10 cts.

Some Hints on the Design and Operation of Intermittent Sand Sewage Filters. 1 111., 1,700 words. Engineering and Contracting, February 16. 10 cts.

Remodel Septic Tank Into a Two-Story Tank. Plant at Lake Forest, Ill., built 14 years ago, outgrown in capacity, changed to modern design at small cost. 1,000 words. Engineering Record, February 12. 10 cts.

Design and Construction of the Sewage Treatment Plant at Pana, Ill. Describes and illustrates design features and gives views of the plant. Tells how the project was financed. By A. C. Stanfield, City Engineer. 7 ills., 2,000 words. Engineering and Contracting, February 9. 10 cts.

Methods, Cost and Results Obtained in the Use of Asphalt for Joints in Tile Pipe Sewers. Gives the advantages of asphalt joints and describes their use in several places. By Paul E. Green. 1 111., 4,500 words. Engineering and Contracting, February 23. 10 cts.

Laying Concrete in Polar Weather. Concrete sewer built at Calgary in cold

winter weather by municipal forces. Aggregate was thawed and heated, the sewer kept warm and protected from the cold. Precautions taken in trenching and back filling. By W. E. Hardenburg. 1 111., 2,200 words. Municipal Journal, February 10. 10 cts.

A Notable Application of Electrically Driven Machinery in Sewer Construction at Salt Lake City. Describes portable sub-station and electrically operated pumps and travelers equipped with pile drivers, buckets and cranes. By B. W. Mendenhall. 7 ills., 1,700 words. Engineering and Contracting, January 5. 10 cts.

Building Release and Outlet Sewers at Chicago. Details of sewer construction which were necessitated by the construction of the new Union Station. 5 ills., 1,800 words. Engineering News, February 3. 15 cts.

Storm Sewers in Moose Jaw, Saskatchewan. Notes on extent of system, recent construction, method employed and costs. A winter undertaking to provide labor for unemployed. By Geo. D. Mackie, City Engineer. 3 ills., 2,000 words. Canadian Engineer, February 17. 15 cts.

Is Concrete a Good Sewer Material? Gives replies from 50 engineers; letters were sent to 94 cities in which concrete sewers were built in 1914. 10,000 words. Concrete, February. 15 cts.

Miscellaneous:

Sewage Gas Tank Utilized for Light and Heat. Metal collectors are placed over vents of Imhoff tanks at Atlanta, Ga. Gas is used for laboratory purposes of heat and light and also for domestic service in author's house. By C. C. Hommon. 2 ills., 1,200 words. Engineering Record, February 5. 10 cts.

WATER SUPPLY.

Water Works:

State Control of Kansas Water Supplies. Powers and duties of the State Board of Health in connection therewith. Rules concerning analyzing water. Fees charged. By C. A. Haskins, Engineer, Board of Health. 2,700 words. Municipal Journal, February 24. 10 cts.

Artesian Wells and Methods of Pumping Them. Discusses location of wells, methods of drilling and construction and methods of pumping. By John D. Kilpatrick. 8,000 words. Water and Gas Review, February. 20 cts.

The Huntington, W. Va., Water System. Report of the National Board of Fire Underwriters covering filtration system, pumping plant and distribution system. 1,800 words. Fire and Water Engineering, February 16. 10 cts.

The Use of Infiltration Galleries in Water Supply. Discusses the proper design of an infiltration supply and factors which affect the yield. 1,300 words. Canadian Engineer, February 17. 15 cts.

Procedure in Maintenance and Operation of Water Works at South Bend, Ind. Also gives the rate schedule and describes record keeping of all sorts. 11 ills., 5,000 words. Engineering and Contracting, January 5. 10 cts.

Design, Construction and Unit Costs of Sooke Lake Water Supply Works, Victoria, B. C. By C. H. Rust, City Engineer. 5 ills., 3,000 words. Engineering and Contracting, February 23. 10 cts.

Some Suggestions Pertaining to the Operation of Water Works Plants. By John W. Toyne, Supt. South Bend Water Works. 1,700 words. Engineering and Contracting, February 16. 10 cts.

Purification:

Iron Removal by Rapid Sand Filtration. From a paper before the American Water Works Association, New York section. By Frank E. Hale. 3 ills., 3,000 words. Fire and Water Engineering, February 9. 10 cts.

Water Disinfection in Canada and the United States. An article dealing with the use of hypochlorite and liquid chlorine and giving statistics of plants describing the various methods of treatment and cost. 1,900 words. Canadian Engineer, February 24. 15 cts.

Cleaning Bayside Filters. Describes the jet method, the water rake method and gives results of comparative tests. By E. G. Manahan. 1,800 words. Fire and Water Engineering, February 9. 10 cts.

Pipe Lines:

Making and Laying Home-Made Pipe for Water Main. Methods used in Plymouth, Mass., with cement lined wrought iron water main. 7 ills., 1,500 words. Engineering News, February 17. 15 cts.

The Construction of the 25. 13 and 12-Inch Steel Mains for the Water Supply of New Westminster, Canada. Gives the history of the water works, describes the

water shed and new water works. Run-off; sanitary precautions; hauling and laying pipe; tests. J. W. B. Blackman, City Engineer. 14 ills., 9,000 words. The Journal of Municipal and County Engineers, February. 60 cts.

Welding High Pressure Mains at Springfield, Mass. From a paper by A. S. Hall, Supt., Springfield Gas Light Company. 21 ills., 3,500 words. Gas Age, March 1. 20 cts.

Cedar River Pipe Line Breaks. Describes condition of pipe and the cause of collapse. Stand pipes were frozen. Some of the frost boxes used to protect stand pipe had been burned or destroyed. By R. H. Ober. 3 ills., 1,500 words. Pacific Builder and Engineer, January. 15 cts.

Why the Seattle Wood Stave Water Pipe Failed. Faulty construction of stand pipe for relieving pressure on the pipe line and neglect to learn that the water in the stand pipe was frozen is given as a reason. By R. H. Ober. 4 ills., 1,500 words. Engineering News, February 3. 15 cts.

Reservoirs:

Design and Construction of the Austin, Texas, Reinforced Concrete Reservoir. Describes expansion joint, floor work and concrete construction. By Lamar Lyndon, and Frank S. Taylor. 1 111., 1,500 words. Engineering and Contracting, February 23. 10 cts.

Salem Covered Concrete Reservoir. Reinforced concrete construction with lead expansion joints and sheet steel cut-offs. Excavation was by day labor, concrete by contract. Prices and cost. By W. B. Conant. 4 ills., 1,500 words. Municipal Journal, February 17. 10 cts.

Design and Construction of the Folly Hill Reservoir of the Salem, Mass., Water Works. Illustrates and describes design features and gives notes on construction. By William S. Johnson. 1 111., 1,250 words. Engineering and Contracting, February 9. 10 cts.

Pumps:

Buffalo Completes Huge New Pumping Station. Describes the Francis G. Ward pumping station. 5 ills., 1,200 words. Engineering News, February 3. 15 cts.

Miscellaneous:

Throttling Gates Save 300,000 Gallons of Water Daily. 1,400 words. Engineering Record, February 5. 10 cts.

Rapid Water Meter Testing. 1 111., 400 words. Engineering News, February 3. 15 cts.

Lost Head Diagrams for Bends in Water Pipe. Various recorded experiments were studied, diagrams plotted and a new diagram made for use in computing loss of head for velocities of from three to sixteen feet per second. By Ben Moreel. 11 ills., 1,800 words. Engineering News, February 17. 15 cts.

The Valuation of Water Works Properties. The 9th in a series of twelve articles. Formulates and discusses the "Separate Plant Theory of Prorating." By Halbert P. Gillette. 1,600 words. Engineering and Contracting, January 5. 10 cts.

Frozen Soil Conditions as Affecting Water Service. By J. D. Marvin. 1,000 words. Engineering and Contracting, February 16. 10 cts.

The Valuation of Water Works Properties. The tenth in a series of twelve articles. This installment deals with the rate of "Fair Return." By Halbert P. Gillette. 2,500 words. Engineering and Contracting, February 2. 10 cts.

STREET LIGHTING AND POWER.

Lighting:

A Model Street Lighting Installation. Description of a recent installation of mazda lamps for street lighting. Details of the cost, layout, construction, operation and appearance of the installation are included. This lighting system in Port Jervis, N. Y., has proved so satisfactory that it will afford a good pattern for other towns. By H. A. Tinson and D. M. Diggs. 8 ills., 2,500 words. General Electric Review, March. 20 cts.

Highway Lighting. The requirements of highway lighting are different from those of street lighting. The greater area makes it necessary to reduce the illumination due to cost. This article gives the results obtained by using luminous arc lamps with diffusing globes and with refractors. By H. E. Mahan and H. E. Butler. 7 ills., 1,000 words. Lighting Journal, February. 10 cts.

Lighting the Residential Streets of New York City. With increase in illumination of the North and South avenues of the city, necessitated by the more dense and rapidly moving traffic, the

side streets seem dark in comparison. A number of tests were made on all types of illuminants to determine which would be most satisfactory. It was found that the type "C" mazda lamps would be most economical. By D. F. Atkins, Chief Engineer of Light and Power, Bureau of Gas & Electricity, New York City. 10 ills., 3,500 words. Lighting Journal, February. 10 cts.

Originality in Street Lighting. Describes several new types of lighting posts and globe arrangements. By Albert Marple. 7 ills., 1,000 words. American City, February. 35 cts.

Power Plants. Efficiency of Municipal Light Plants. Comparative investments, plant equipment and operating cost of municipal and private plants in Massachusetts. 3,000 words. Municipal Journal, February 24. 10 cts.

Waste in Public Utility Power Plants. From a paper by F. W. Collins, in the Engineering Magazine. 3,000 words. American Gas Light Journal, February 14. 10 cts.

Rochester State Hospital Plant. A modern power plant having a direct current capacity of 300 k. w. and 1,250 h. p. in water tube boilers. Designed to supply light, heat and steam to the Rochester, Minnesota, state hospital. In the first year of operation the plant saved \$15,000 in fuel over the old plant it replaced. By Thomas Wilson. 9 ills., 2,000 words. Power, February 8. 5 cts.

Data and Discussion on Efficiency in Public Utility Power Plant. Discusses the various items which tend to make a plant inefficient, gives tabular data and charts and illustrates some common reasons for low efficiency. By C. S. Brossman. 7 ills., 4,000 words. Engineering and Contracting, February 16. 10 cts.

Gas:

Gas House Heating. Estimate of cost of heating houses of different types and sizes with gas. Some experiences and costs of gas heating are given. By F. R. Hutchinson. 62 ills., 62 pages. Journal of Cleveland Engineering Society, January. 35 cts.

Gas Fired, Hot Air, Circulating Heaters. Heating apartment houses with gas. The second in a series of articles showing how gas is used in the equipment of modern buildings. By H. T. Owens. 4 ills., 1,200 words. American Gas Light Journal, February 21. 10 cts.

The Substitution of Heating Value for Candle Power as a Standard for Gas Quality. Gives specifications of quality which gas supply should meet. From a paper by R. S. McBride. 10,000 words. American Gas Light Journal, February 14. 10 cts.

Differential Gas Rates in Baltimore. Outlines the working out of the differential rate schedule and the purposes in view. By Douglass Burnett. 6 ills., 4,000 words. Gas Age, February 1. 20 cts.

Miscellaneous:

The History and Purpose of Concentric Wiring. Abstract of an address by R. S. Hale. 3,000 words. Electrical World, February 5. 10 cts.

Temporary Gas By-Pass Over Decked Subway Excavation. A description of a unique and successful method of handling gas mains encountered in subway excavations in New York City. By J. E. Worsley. 10 ills., 6,000 words. Gas Age, March 1. 20 cts.

FIRE EQUIPMENT.

Protection:

Philadelphia Has Progressed. Many recent improvements have benefited city's fire protection; fire alarm system; motor apparatus and water distribution greatly strengthened. 1,000 words. Fireman's Herald, February 5. 5 cts.

Cost of Water for Fire Protection. Discusses the question of fire protection without charge for water and of hydrant rents. By Delos F. Wilcox. 4,000 words. American City, February. 35 cts.

Cedar Rapids Fire Protection. Capable department but not enough of it. Loss per fire and per capita low. 2,500 words. Fireman's Herald, February 19. 5 cts.

Prevention:

Fire Prevention in Portland. Number of fires reduced 50 per cent by fire bureau. Inspection, education and arson detection. Fire drills in schools. By H. M. White. 2 ills., 2,200 words. Municipal Journal, February 10. 10 cts.

Fire Prevention by Firemen. Practical suggestions for building inspection from a practical fireman. By C. W. Tisdale. 1,200 words. Fireman's Herald, February 12. 5 cts.

Practical Fire Prevention. Discusses insurance, the more common causes of fire and talks about politics in fire department. By R. O. Mesnar, Chief, Canton, O. 1,500 words. Fireman's Herald, February 5. 5 cts.

The Fireman and Fire Prevention Work. By John J. McCarty. 1,200 words. Safety Engineering, February. 25 cts.

Building Inspections From a Fireman's Standpoint. By James Crapo, Battalion Chief, Chicago. 1,800 words. Fire and Water Engineering, February 9. 10 cts.

Miscellaneous:

Some Reasons for Our Fire Losses. Gives the reasons for greater loss in America than in Europe; firemen's inspection. By H. W. Bringham, Fire Marshal, Seattle. 2,000 words. Fire and Water Engineering, February 2. 10 cts.

Instructions on Handling Gasoline. The Bureau of Mines in its report discusses hazards that may result from handling this liquid and outlines precautions to be observed for gasoline and other readily inflammable liquids. By Geo. Burrell. 3,000 words. Oildom, February. 25 cts.

Traction Under Difficult Conditions. Reports from various cities as to experience with motor and horse apparatus in deep snow or on bad roads. 1,500 words. Fireman's Herald, February 26. 5 cts.

Promotion System of St. Louis. Candidates are tested as to firemanship, physical condition and experience. The latter is divided into management, personality, individual performance and conduct; text of recent examination papers. 1 ills., 1,800 words. Fireman's Herald, February 26. 5 cts.

George Washington as a Fireman. By S. F. Hunter, Chief, Springfield, Ohio. 2,000 words. Fire and Water Engineering, February 23. 10 cts.

TRAFFIC AND TRANSPORTATION.

United States has 2,423,788 Cars. Figures showing the number of cars in the United States, the number in each state and the number of people per car. The 1915 registration show an increase of about 40 per cent over 1914. By Donald McLeod Lay. 5 ills., 4,000 words. The Automobile, February 17. 10 cts.

The Horse Versus the Electric Vehicle. Some original statistics on the advantages of electric vehicles compared with horse-drawn equipment in commercial service. By A. J. Marshall. 3,000 words. Electrical Review, February 5. 10 cts.

Limitations of Maximum Earning Capacity. The building and financing of subways. By M. C. Brush. 5,000 words. Aera, February. 25 cts.

Street Traffic Regulation in Boston. Describes system of signals used at crossings. By W. B. Conant. 1,000 words. Municipal Journal, February 10. 10 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Collection and Disposal of Refuse. Classifies city waste and gives the various methods of disposal. Methods of collection. By D. C. Faber. 7,000 words. American Municipalities, February. 20 cts.

Cleaning Up After Snow Storms in Philadelphia. Describes methods of snow removal. By William H. Connell. 9 ills., 1,800 words. Engineering News, Feb. 3. 15 cts.

Systematic Snow Removal in New York City. Describes organization of New York street cleaning department for snow removal. 7,000 words. Municipal Engineering, February. 25 cts.

CITY PLANNING.

Municipal Engineering in 1915. A resume of municipal engineering work during the past year in Great Britain. 20 pages. The Surveyor, January 28. 40 cts.

Homes for Factory Operators on a Model City Plan. Describes the suburban development by the Goodyear Company at Akron, O. 12 ills., 2,500 words. Manufacturers Record, February 10. 15 cts.

Housing in England. Describes the problems to be met with in England, where over 75 per cent. of the people live in cities. Over half of those living in cities are living in tenements of four rooms or less. By H. N. Shepard. 6,000 words. Pacific Municipalities, February. 25 cts.

A Topographic Survey of Large City. Describes the importance of a topographic map and tells how Cincinnati's

map was made. By H. C. Mitchell, Geodetic Engineer. 5 ills., 1,500 words. American City, February. 35 cts.

GOVERNMENT AND FINANCE.

Certain Trends in Municipal Development. Annual address of the President of the League of Washington Municipalities. January. 25 cts.

American Cities and the Prevention of Unemployment. By John B. Andrews, Secy. of the American Association for Labor Legislation. 3 ills., 2,000 words. The American City, February. 35 cts.

Methods of Assessing Property. Reports from California cities, giving methods of assessment in use. 6,000 words. Pacific Municipalities, February. 25 cts.

Some Practical Pointers in Buying for City. Traces the development of scientific municipal purchasing and gives many helpful hints on the preparation of specifications, watching the market, etc. By F. S. Smith, City Purchasing Agent, Dayton, O. 4,200 words. Engineering and Contracting, February 2. 10 cts.

Municipal Supply Department. Gives a plan for purchasing supplies which may be fitted to any conditions, reducing the amount of machinery and the number of employees to suit the smaller business of smaller cities. By H. M. Foster. 3,500 words. Municipal Engineering, February. 25 cts.

Lessening Cost of Valuation of Public Utilities. Part of address by Leonard Metcalf before the New England Water Works Association. 1,200 words. Engineering News, February 3. 15 cts.

Cleanliness Standard for Street Cleaning for First Time. No dirt is permitted to lie on pavements for more than 15 minutes in Chicago shopping district. Some cleaners make 70 trips per day over their district. 5 ills., 2,500 words. Engineering Record, February 19. 10 cts.

Utility-Franchise Policy for Model City Charter. 500 words. Engineering News, February 3. 15 cts.

BRIDGES.

Two Early Suspension Bridges Just Taken Down. Have been replaced by modern structures. 2 ills., 1,300 words. Engineering News, February 3. 15 cts.

Bascule Bridge of Short Span. Sixty-foot span bridge built over Ecorse river, Detroit. 4 ills., 1,500 words. Engineering News, February 10. 15 cts.

Painting and Maintaining Steel Highway Bridges. By Geo. Hogarth. 3,500 words. Canadian Engineer, February 17. 15 cts.

Methods and Equipment Used in Constructing a Reinforced Concrete Viaduct at Danville, Ill. Gives layout of construction plant and views of work. By N. B. Garver. 5 ills., 1,000 words. Engineering and Contracting, February 9. 10 cts.

Concrete Highway Trestle. Longest concrete highway trestle, three miles long. Precast floor slabs on precast pipe bents. Details of design and construction. 12 ills., 3,500 words. Engineering News, February 24. 15 cts.

Highest Arch Highway Viaduct of Striking Appearance Economically Constructed. High level bridge over Cuyahoga river gorge erected on steel arch centers previously used. 4 ills., 1,500 words. Engineering Record, February 12. 10 cts.

A Labor Cost Keeping System for Concrete Bridge Work. Describes and gives forms for a practical cost keeping system. By R. A. Small. 2 ills., 1,250 words. Engineering and Contracting, February 9. 10 cts.

MISCELLANEOUS.

Practical Selection of Aggregates for Concrete. Notes covering fourteen years' experience. By R. J. Borhek. 1,750 words. Engineering and Contracting, February 16. 10 cts.

Concrete Aggregates: Second Article—Tests and Test Methods—Sampling. By William M. Kinney and Duff A. Abrams. 1 ills., 8,000 words. Concrete, February. 15 cts.

Experience in Furnishing Sand and Gravel for Concrete to Contractors of the Greater Winnipeg Water District. By J. H. Fuentes. 1 ills., 2,800 words. Engineering and Contracting, February 9. 10 cts.

Theoretical Determination of the Bending Moment and Deflection in Columns Subjected to Combined Bending and Deflection. Derives column formulas

(Continued on page 349.)

NEWS OF THE SOCIETIES

Calendar of Meetings.

March 6-10.—DOMINION GOOD ROADS ASSOCIATION. Third Canadian and International Good Roads Congress, Sohmer Park, Montreal, P. Q. Secretary-Treasurer, Geo. A. McNamee, 909 New Birks Bldg., Montreal.

March 21-23.—AMERICAN RAILWAY ENGINEERING ASSOCIATION and NATIONAL RAILWAY APPLIANCES ASSOCIATION. Annual meeting and exhibition, Chicago, Ill.

March 23, 24.—FLORIDA STATE GOOD ROADS ASSOCIATION. Annual convention, St. Augustine.

May 8-10.—SOUTHWESTERN WATER WORKS ASSOCIATION. Annual convention, Waco, Tex. Secretary, E. L. Fulkerson, Waco, Tex.

May 10-17.—NATIONAL CONFERENCE OF CHARITIES AND CORRECTIONS. Annual conference, Indianapolis, Ind.

May 31-June 2.—NEW YORK STATE CONFERENCE OF MAYORS. Annual conference, Syracuse, N. Y.

May 31-June 2.—NATIONAL ASSOCIATION OF COMPTROLLERS AND ACCOUNTING OFFICERS. Annual convention, Syracuse, N. Y.

June 4-8.—AMERICAN WATER WORKS ASSOCIATION. Thirty-sixth annual convention, New York, N. Y. Secretary, J. M. Diven, 47 State Street, Troy, N. Y.

June 15, 16.—OHIO SOCIETY OF MECHANICAL STEAM AND ELECTRICAL ENGINEERS. Convention, Cleveland, O. President, Joseph L. Skeldon, Toledo.

June 28-30.—MICHIGAN LEAGUE OF MUNICIPALITIES. Annual meeting, Battle Creek, Mich.

July 11-13.—MUNICIPAL LEAGUE OF INDIANA. Annual meeting, Goshen, Ind.

Aug. 7-9.—CITY MARSHALS' AND POLICE CHIEFS' UNION OF TEXAS. Annual convention, Houston, Tex.

Sept. 6-9.—LEAGUE OF AMERICAN MUNICIPALITIES. Annual convention, Newark, N. J.

AMERICAN ROAD BUILDERS' ASSOCIATION.

The 13th annual convention of the American Road Builders' Association combined with the 7th National Good Roads Show was held in Pittsburgh February 29th to March 3rd. While it was generally remarked that there had been larger attendance at one or two previous conventions of this association, it was also the general opinion that at no previous one had there been as large an attendance at the reading and discussion of papers, this attendance varying probably between 200 and 300 at every session. The exhibitors of road appliances and materials also stated that, while there had been a larger number of visitors to their booths at some previous conventions, there had been none at which visitors had appeared to take more general interest in the exhibits as possible users or purchasers.

The convention opened at 11:30 Tuesday morning by addresses of welcome by Mayor Armstrong, R. S. McDowell, superintendent of highways of Chester County; Joseph W. Hunter, first deputy state highway commissioner of Pennsylvania; D. P. Black, president of the Pittsburgh Chamber of Commerce, and A. C. Gumbert, county commissioner of Allegheny County. Col. E. A. Stevens, president of the association, responded, and brief addresses were made by other gentlemen. At 2.30 p. m., R. Keith Compton of

Baltimore read a paper on "Railway Track Construction in Paved Streets," which was discussed by H. W. Durham, county engineer of Bergen County, N. J.; J. M. Larned, engineer of way of the Pittsburgh Railway Company; Gordon Campbell, president and general manager of the railways of York, Pa.; J. Toner Barr of the Pittsburgh Chamber of Commerce; E. B. Ulrich, city engineer of Reading, Pa.; W. M. Kinney, inspecting engineer of the Universal Portland Cement Company, and others. In the absence of the author there was read by title a paper by N. S. Sprague, chief engineer of the Pittsburgh Bureau of Engineering, entitled "The Control of Openings in Pavements," which was discussed by George E. Datesman, director of public works of Philadelphia, and H. W. Durham. On Tuesday evening the delegates attended a theatre party.

The Wednesday morning session was occupied by the reading and discussion of a paper by W. D. Uhler, chief engineer of the Pennsylvania State Highway Department, entitled "Recent Developments in the Building of Concrete Roads." This was discussed by R. L. Morrison, professor of highway engineering, Agricultural and Mechanical College; H. B. Shattuck, assistant professor of railroad engineering, Pennsylvania State College; Anthony Bowen, mayor of Fairmont, W. Va.; H. K. Talbot; Harvey Linton, of Altoona, Pa.; C. H. Roper, president of the Omaha, Lincoln and Denver Highway, Lincoln, Neb.; B. Woodward, Parkersburg, W. Va.; W. M. Kinney, inspecting engineer, Universal Portland Cement Co.; John T. Harrop, supervisor of roads, Bergen County, N. J.; A. T. Chollar, of the Association of American Portland Cement Manufacturers; T. J. Jones, city engineer, Brantford, Canada; Charles Whiting Baker, editor of "Engineering News"; Wm. M. Acheson, of the New York State Highway Department; F. W. Patterson, Cleveland, Ohio; James H. MacDonald, formerly state highway commissioner of Connecticut; R. A. Meeker, state highway engineer of New Jersey, and others. The points receiving the most discussion were the life of concrete pavements, qualities desirable in the several aggregates, inspection of paving construction, and the grades at which concrete pavement could be successfully used. In the afternoon John H. Gordon, contractor, of Albany, N. Y., read a paper entitled "A Contractor's Suggestions to Engineers and Inspectors," which was discussed by F. E. Ellis of Melrose, Mass. A paper by F. C. Pillsbury, division engineer of the Massachusetts Highway Commission, entitled "Adaptability of Paving Materials to Different Conditions and Localities," was read by title in the absence of Mr. Pillsbury, and was discussed by F. P. Smith of New

York City, E. B. Ulrich and others. F. E. Everett, state highway commissioner of New Hampshire, read a paper entitled "Roads at Low Cost for Modern Traffic," which was discussed by Charles H. Neal of North Carolina; A. W. Dean, chief engineer of the Massachusetts State Highway Commission; Joseph W. Hunter, Nelson P. Lewis, chief engineer of the Board of Estimate and Apportionment of New York City; W. M. Kinney, and others. A paper entitled "Foundations for Roads and Streets" was then read by the author, Jos. W. Hunter, and discussed by H. K. Talbot, R. L. Morrison, C. H. Neal, W. M. Kinney and J. S. Pardee. In the evening the annual banquet of the association was held at the Fort Pitt Hotel. At this banquet, which was attended by nearly 400 delegates and guests, speeches were made by Mayor Armstrong, J. H. McDonald and Edward M. Bigelow, former state commissioner of highways of Pennsylvania. The last named was unfortunately taken ill just as he was beginning to speak, and this threw a slight damper on the occasion.

On Thursday morning H. E. Breed, first deputy commissioner of New York State Highways, read a paper on "Brick Streets and Roads," in which he gave some very interesting figures concerning the cost of constructing and of maintaining such roads in New York state, giving averages based on several hundred different sections. This paper was discussed by W. C. Perkins, engineer of the Dun Wire-Cut-Lug Brick Company; M. B. Greenough of the Case School of Applied Science; Patrick Ridge, contractor, of Pittsburg, and others. In the absence of the author, Charles F. Knowlton, his paper entitled "Recent Tendencies in Stone Block Pavements," was abstracted by H. W. Durham, who gave a running discussion of the same, the paper being further discussed by A. F. Rhodes of Worcester, Mass., and others. A discussion on "The Function of Stone in Bituminous Concrete Pavements" was taken part in by R. B. Gage, chemist of the Department of Public Roads of New Jersey; Charles W. Baker, W. W. Crosby and others. In the afternoon the delegates were taken on an automobile ride, but their inspection of the street and highway pavements was rendered unsatisfactory by a fall of snow during the night before. There was no session in the evening.

During the last session, Friday morning, Chas. M. Upham, chief engineer of the Coleman du Pont Highway, read a paper entitled "The du Pont Road," in which he described the construction and difficulties overcome. This was followed by considerable discussion. N. S. Sprague, chief engineer of Pittsburgh Bureau of Engineering, read his paper on "Control of Openings in Pavements," postponed from Tuesday afternoon. This also was followed by discussion by several members. In the absence of Henry L. Bowlby, his paper—"The Columbia

Highway"—was read by Lloyd McIntyre, of Trenton, N. J.

Exhibits.

The exhibition of appliances and materials was held in a large municipal hall, one of several used by the city for convention and similar purposes, which hall was well filled by exhibitors. Along half of one side was the exhibit of the Bureau of Engineering of the city of Pittsburgh, in which were shown drawings and photographs illustrating street paving methods and conditions in the city, and by a smaller exhibition of the same kind by the city of New York. Other sections in which were exhibited photographs and maps of highways were occupied by the Road Department of Allegheny County, the Department of Public Roads of the State of New Jersey (which also showed samples of gravel, stone, etc., used by the state) and the Highway Department of the State of Pennsylvania, which also distributed copies of the periodical published bi-monthly by them called "Pennsylvania Highway News." Other exhibitors were as follows, arranged in the order of their exhibits in the hall:

Atlantic Refining Company—Models of roads built by penetration method and by surface treatment, sheet asphalt and asphaltic concrete. Jars of asphalt and revolving illuminated transparency.
Asbestos Protected Metal Company—Samples of joint filler of asphalt without felt and with high penetration point.
United Gas Improvement Company—Samples and drums of Ugitite and photographs of roads.
Hydrated Lime Bureau—Literature giving the uses and advantages of hydrated lime, the Bureau representing an association of manufacturers.
National Fire Proofing Company—Models of Natco tile for drains and large full sized section of Natco tile sewer.
Cast Iron Pipe Manufacturers—A length of 6-foot cast iron pipe for culverts.
Pittsburgh Wood Preserving Company—Section of yellow pine pavement 13 years in service, illuminated photographs of pavements, treated and untreated blocks.
International Harvester Company of America—Motor trucks and, just outside the building, a Mogul engine which was kept in operation most of the time.
Orenstein—Arthur Koppel Company—Side dump cars, and outside the building, a train of such cars with engine.
Keystone Drill Company—Traction excavator adapted for highway excavation, which was kept in actual operation just outside the building.
McCarter Asphalt Block Press—Literature.
Wadsworth Stone & Paving Company—Samples of Kentucky rock asphalt in the rock and pulverized for laying; photographs and literature.
Bitoslag Paving Company—Sample of pavement laid in Philadelphia in 1915 and one in McKeesport after five years' service.
F. D. Cummer & Son Company—Photographs of asphalt mixers and literature.
Matthews Gravity Carrier Company—Carriers for paving brick and cement bags, which were operated at intervals.
Barrett Manufacturing Company—Tarvia literature, samples of solid pavement jointing material.
Cement and Engineering News—Samples of their periodical.
Blaw Construction Company—Forms for concrete curb and gutter construction.
Wiard Plow Company—Contractors' plows.
I. W. Scott Company—Agent for Eagle Wagon Works—Wagons and plow.
Eugene Dietzgen—Surveyors' and draftsmen's instruments.
B. K. Elliott Company—Buff and Buff instruments for surveyors and draftsmen.

Robert W. Hunt Company—Specifications for various materials entering into road work, bridges, etc.

Pennsylvania Dolorway Paving Company—Samples removed from pavement, photographs, etc.

Ball Engineering Company—Literature and photographs concerning Erie steam shovels.

"Municipal Journal"—Samples of the periodical.

Good Roads Machinery Company—Monarch roller and scarifier, Little Winner scraper, corrugated culverts, models of Champion crusher and Champion scraper.

Galion Iron Works—Illuminated views of road machinery, models of Eclipse unloader, road scrapers, steel drags, etc.

Heltzel Steel Form & Iron Company—Steel forms for curbs, gutters, sidewalks and concrete roads; car unloader.

Jaeger Machine Company—Big-and-Little concrete mixer, concrete buggy.

Baird Machinery Company—Portable pump, Studebaker wagons.

Sterling Motor Truck Company—Chassis fitted with squeegee street cleaner, together with water tank.

Pierce-Arrow Motor Car Company—Dumping truck and chassis.

Locomobile Company of America—A 4-ton truck and two chassis.

Garford Motor Truck Company—Dumping truck.

Packard Motor Company—A 4-ton dumping truck, and a chassis.

Autocar Company—A 2-ton truck with Excelsior lift. (All other trucks were fitted with Wood Hydraulic hoist.)

Koehring Machine Company—Two concrete mixers, one with spout distributor and one with boom and bucket distributor.

Buffalo Steam Roller Company—Photographs and roller parts.

Brinker Supply Company—Corrugated pipe; agents for New Holland Machine Co.

Acme Road Machinery Company—Photographs and literature of road machinery.

Northwestern Steel & Iron Works—Concrete mixer literature, samples of 24-in. concrete pipe made with their forms.

Hetherington & Berner—Photographs of road and of railway asphalt plants.

Turbine Sewer Machine Renovating Company—Machines and photographs of same.

Contractor's Machinery & Supply Company—Concrete mixers, Lansing paver, Republic "Light Ten" mixer.

Connelly & Company—Tar kettle, combined asphalt heater and road oil distributor.

Domestic Engine & Pump Company—Portable pumping engine in operation, pumping muddy water. Photographs.

Chris D. Schramm & Son—Portable air compressors.

Dun Wire-Cut-Lug Brick Company—Samples of wire cut lug bricks by various manufacturers; sections removed from brick pavements; large section of pavement laid with wire-cut-lug bricks with cement filler; literature and photographs.

Duquesne Slag Products Company—Samples of broken slag.

Joseph N. Early—Signs for streets, roads and all purposes, and supports for same.

"Good Roads"—Samples of periodical.

John Baker, Jr.—Samples of Asphaltic and of treated and untreated brick after rattler test; Texaco asphalt for pavement filler; photographs and literature.

Standard Oil Company of New York—Literature.

Standard Oil Company of Indiana.

Warren-Knight Company—Engineers' transits and levels.

National Paving Company of Scranton and Bituminized Road Company—Samples of National pavement and photographs.

Concrete Products Company—Reinforced concrete pipes and beams.

Phillip Carey Company—Samples of joint filler for brick, stone and concrete pavements.

Donald McNeil Company (agent of Warren Bros. Company)—Photographs and samples of Warrenite pavement and other paving materials.

W. & L. E. Gurley—Engineers' and surveyors' instruments.

Hastings Pavement Company and Asphalt Block Paving Company—Photographs, samples of asphalt block; operated model of rattler testing model asphalt blocks.

Pittsburg Testing Laboratory—Samples of brick which have been rattler-tested, of concrete tested for compression, etc.

Robeson Process Company—Photographs of roads and samples of Glutrin.
U. S. Asphalt Refining Company—Photographs and samples of asphaltic materials.

Safety-First Exposition.

A safety-first exposition by government bureaus was held at the New National Museum in Washington from February 21 to 26, inclusive. The purpose of the exposition was to demonstrate to the public what the Federal Government is doing toward saving life and property.

Twenty-six bureaus participated. Each bureau showed such appropriate material and apparatus as it uses, and all apparatus exhibited was demonstrated by experts.

Those co-operating in the exhibit were: The bureau of standards, coast and geodetic survey, bureau of light-houses, steamboat inspection service and bureau of navigation of the Department of Commerce; the bureaus of medicine and surgery, bureau of steam engineering, bureau of ordnance and bureau of construction and repairs of the Navy Department; the weather bureau and the forest service of the Department of Agriculture; the bureau of labor statistics and the children's bureau of the Department of Labor; the bureau of mines, the reclamation service, the Indian office, the geological survey and the bureau of education of the Interior Department; the public health service and the coast guard service of the Treasury Department; the medical service of the War Department; the inter-state commerce commission, the American National Red Cross Society and the police department of the District of Columbia.

The idea of holding the exhibit originated with the bureau of mines, which has always been active in danger prevention and rescue work, and the committee in charge has placed Morton F. Leopold of that bureau in general supervision.

The various displays demonstrated the almost limitless field of the "safety first" work done by Uncle Sam, evidenced by the fact that so many units of his federal departments are enabled to contribute to the exhibits.

Striking charts, showing death hazards in the cotton industry by age, sex, race and workrooms, formed part of the exhibit of the bureau of labor statistics. Death certificates were accepted as establishing that certain numbers of women and children had died. The lives of those persons were then studied and the underlying causes of death in the cotton industry brought out.

Tuberculosis deaths were shown in orange on the charts. The most striking chart was that showing the large number of deaths of married female operatives due to tuberculosis, almost as great as from all other causes put together.

The second chart showed "death hazards in a cotton manufacturing city by sex," and shows from non-tuberculosis causes seven deaths per 1,000 population in 4,590 married female operatives examined, and nearly six deaths

per 1,000 from tuberculosis. Male (married) operatives showed less than three deaths per 1,000 population from non-tuberculosis, and slightly over two deaths from tuberculosis.

Regarding workrooms, the cardroom mortality from tuberculosis for females was found to be the largest in any of the rooms, the cardroom, spinning room, weaving and other rooms. Spinning room mortality from the same cause was likewise high. In the cardroom four deaths per 1,000 population were registered from tuberculosis among females.

"Death hazards in the cotton industry by race," one of the four charts, showed that the Irish female workers had the largest death rate per 1,000 population.

Just how the weather bureau works in sending out storm warnings and warnings against floods, as well as in its general weather forecast, was shown. The safety first work of the Interstate Commerce Commission was also shown by means of charts, models and diagrams. The commission, by compelling the railroads of the country to adopt safety appliances, has brought about a tremendous reduction in the number of wrecks, the number of persons killed in this manner last year being 222 out of more than 1,000,000 passengers carried, a reduction of 16.2 per cent from 1914.

The bureau of mines demonstrated its life-saving apparatus, such as the pulmonary for reviving victims from smoke and gas, and masks for protection against mine gases and the smoke in burning mines. The bureau has taught first aid to more than 1,000,000 miners in the country, the result being a notable reduction in the death rate among miners.

Samples of defective parts which either did cause or might easily have caused railroad disasters of greater or lesser degree were a feature of the exhibit of the division of locomotive inspection of the interstate commerce commission. These included defective high-pressure piping, defective crown sheet bracing and defective boiler plates. The exhibit also included a display of shields and guides devoted to the minimizing of accidents, interesting to expert and layman alike.

Another striking instance of the value of the work of this branch of the commission was prominently brought out in a series of charts showing the recent decrease in boiler accidents due to federal supervision. By this means the number of such accidents in 1915 was reduced from the number in 1912 by 50.5 per cent; the number of persons injured thereby by 53.5 per cent, and the number of persons killed by 85.7 per cent. Furthermore, with the decrease in accidents there has been an accompanying improvement in the boilers themselves, so that federal supervision works to two good ends. In 1912, for instance, 66 per cent of all boilers inspected were found defective; in 1915 only 44 per cent. In 1912, 5 per cent of those inspected were ordered

MUNICIPAL INDEX

(Continued from page 346.)

and discusses results for the following four cases: Axial load alone; axial load and horizontal force; axial load and horizontal uniform pressure; axial load and any horizontal forces. By David Kaplan. 4 ills., 3,000 words. Engineering and Contracting. February 2. 10 cts.

A Fallacy in the Design of Retaining Walls. An error in current theory is explained. By Gilbert D. Fish. 3 ills., 1,600 words. Engineering News. February 10. 15 cts.

County Engineering in Kansas. Outlines difficulties met with by the poorly paid county engineers in the western states. 3 ills., 800 words. Engineering News. February 17. 15 cts.

Some Better Kutter's Formula Coefficients. Values of "n" for 38 classes of channel and pipes and a wide range of conditions. By R. E. Horton. 1,100 words. Engineering News. February 24. 15 cts.

The Action of Water Under Dams. Mathematical discussion developing the law of underground flow and its application to pressures in vertical or horizontal planes. 2,500 words. Water and Water Engineering. February 15. 40 cts.

Breaking down the Language Barrier. Teaching the foreign laborer to speak English by system of instruction cards. Method applicable to any language. By J. D. Hackett. 2,000 words. Iron Age. February 3. 20 cts.

The Origin of English Measures of Length. Describes the development of these measures and also of the measures used in calculating areas and great distances. By Sir C. M. Watson. 4,600 words. American Gas Light Journal. February 21. 10 cts.

Children in City Clean-up Work. Describes the use made of children in Boston, Hartford, Salt Lake City, Reading, Providence and other cities. 6 ills., 2,000 words. The American City. February. 35 cts.

Improving the Miami at Dayton. Straightening and deepening river and constructing embankments along both sides. Constructing plant included steam shovels and cableway. 1,600 words. Municipal Journal. February 17. 10 cts.

completely out of service; in 1912 but 2.75 per cent were ordered discarded.

The work of the coast and geodetic survey in providing charts for the safeguarding of life and commerce formed the subjects of a lecture delivered by Dr. C. Lester Jones, superintendent of the bureau. Dr. Jones touched especially on conditions in Alaska and pointed out that because of lack of navigation charts and other aids insurance companies will not take risks on vessels sailing for ports in that territory. Moving pictures and lantern slides illustrative of these Alaskan conditions were a feature of the lecture, in which comparison of the wrecks in charted and uncharted waters was made, and the work necessary to properly show the safe channels and dangerous rocks and shoals graphically presented.

American Railway Engineering Association.

The annual meeting of the American Railway Engineering Association will be held at Chicago, March 21-23, and in the same week the National Railway Appliances Association will, as usual, conduct its annual exhibit at the Coliseum.

Four States Highway Association.

In response to a call issued about February 1, by the Texarkana Board of Trade, about fifty delegates from a number of surrounding counties met at

Texarkana, Texas, February 10, for the purpose of organizing the Four States Highway Association, the object of which is to be the building and development of good roads in that territory.

Organization was effected by the election of George R. Payne, of Texarkana, president; Dr. M. V. Newman of Fouke, vice-president, and Frank F. Quinn of Texarkana, secretary and treasurer. It was agreed that each county shall have a separate organization of its own and that each county shall have equal representation in the central organization, whose headquarters shall be in Texarkana. Money for making maps and for incidental expenses was raised. It was ordered that another meeting be held at Texarkana February 22, when constitution and by-laws were adopted and other business transacted. It also was agreed to have as large a representation as possible at the Arkansas Jefferson Highway meeting at Forth Smith.

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PERSONALS

Berry, Caleb, has been appointed city engineer of Centralia, Wash.

R. M. Barry, R. L. Ralston and George Guderian have been appointed members of the park commission of Middlesboro, Ky.

Bayne, J. P., after 31 years' continuous service with the City of Cleveland, O., has resigned as city paving engineer to accept a similar position with the Cleveland Railway Company.

Elwood, Henry E., consulting engineer, Southwestern Life Building, Dallas, Tex., has been retained by the city of Cooper, Tex., to design waterworks and sewage system.

Grant, Bertrand E., recently elected president of the Western Society of Engineers, is division engineer of the Board of Local Improvements, Chicago. Directly after graduation from Rensselaer Polytechnic Institute in 1890 at the age of 22, he joined the engineering corps of the Sanitary District of Chicago on the construction of the big drainage canal, serving until 1898 with the exception of one intervening year, when he was assistant city engineer of Waterbury, Conn. He then acted as resident engineer of the water-power development of the Snoqualmie Power Company. For several years he engaged in consulting engineering practice, taking his present position in 1905. In recent years he has been engaged principally on the engineering work of the proposed Michigan Boulevard Link and on sewer construction and sewage pumping in the southern parts of the city.

Perkins, Chester A., has been appointed Building Commissioner of South Bend, Indiana.

Rights, William H., has been appointed city engineer of Seymour, Ind.

Tomlinson, Rupert H., street commissioner of Iliion, N. Y., has resigned.

Wills, Harry L., has been reappointed chief of the York, Pa., police force.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

SIMPLEX CONCRETE MIXERS.

Batch and Continuous Machines.

The Simplex batch mixer is of the revolving drum type designed for the economical production of concrete in quantities. The elimination of slow loading and discharging of material and of wheeling to high platforms are two features of the operation of the mixer.

The frame work is entirely of steel and heavy 5-inch channels are used for the side and cross-rails. The posts or frame supporting the hopper and discharge scoops are of heavy $2\frac{1}{2} \times 2\frac{1}{2}$ -inch angle iron and the loading platform is of No. 10 gauge boiler plate steel, underneath which is concealed the gearing. The trucks are of ample strength to meet the strain and vibration of batch mixer operation. The wheels are of 4-inch steel grooved tire and staggered spokes and have a long axle bearing.

The drum does not tilt to discharge. It is cylindrical with very heavy cast heads with rounded corners to prevent concrete from clogging. The heads are hot-riveted to a central shell of very heavy boiler plate steel in such a way as to make a durable and water-tight drum. This is driven from the center by a heavy sprocket band and heavy riveted link chain belt. This eliminates the possibility of stripped gears caused by small stones. The interior blades and buckets have been improved in design and increased in number to accelerate mixing and discharging. The drum roller is keyed

onto the shaft, which rotates with the rolls in long babbitted bearings, which are lubricated with hard oil forced into them by dust-proof grease cups. The rolls are carefully chilled and turned. This construction is designed to eliminate troubles caused by wear in the runways and drum rolls frequent when the rolls rotate on a fixed shaft so that all the wear comes on top of the shaft and the bore in the rolls at the ends producing a rounded face and causing imperfect lubrication and alignment.

The discharge chute is made in two pieces, the outer fixed to the frame and the inner, upper end is pivotal. This affords ample clearance for the wheelbarrow. The chute is made of heavy boiler plate steel which retains its shape. The upper, movable chute during the mixing is released by a heavy spring.

"Ideal" or "Novo" 4 h.p. engines are used with the Simplex mixers. These engines are water-jacketed and of lasting construction. They give ample power for their work.

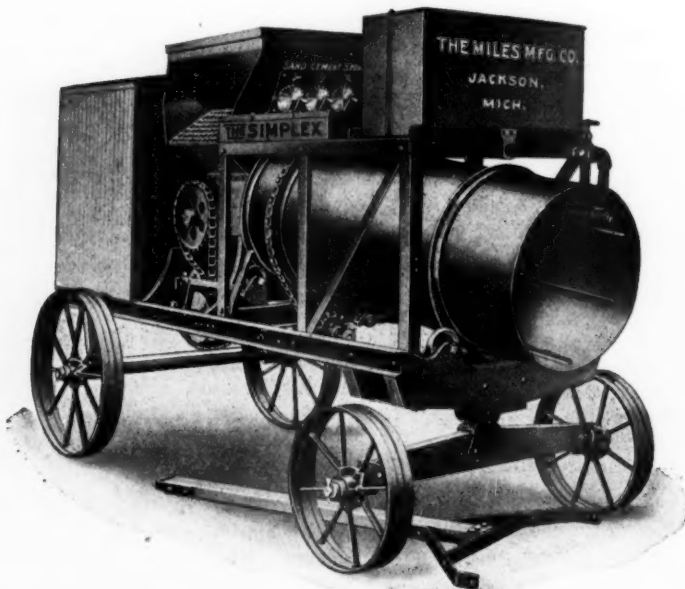
The Simplex No. 8 has a capacity of 8 cubic feet. It can be furnished with a wheelbarrow hopper or with a batch-hopper and trip slide. The drum may be had turned to make a side-feed and side-delivery mixer. The engine is securely housed and away from the dirt. The large steel platform between the engine housing and the drum is convenient in dumping the wheelbarrow. A bracket can be put on each side so the wheelbarrow can be taken up from one side and down the other.

THE SIMPLEX CONTINUOUS MIXER.

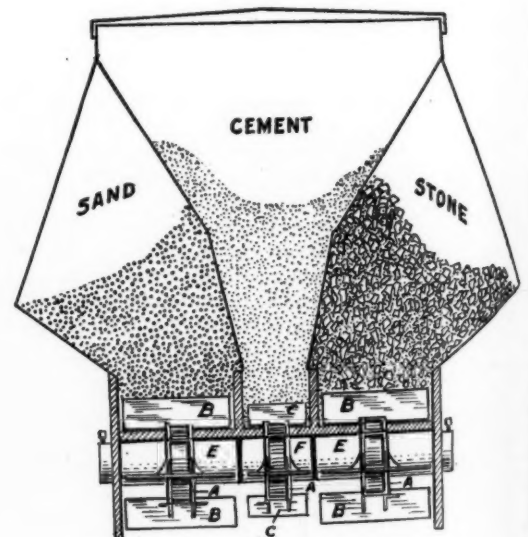
The continuous mixer operates on the rolling principle of the batch mixer and has a positive continuous feeding and measuring device. It is of the same sturdy construction as the other mixer and the gearing is enclosed against dirt. The mixer is specially designed for paving and similar contract work and is built in only one size, which has a capacity up to 100 yards in ten hours. It can be adjusted for any smaller output. The three-part hopper enables the operator to feed sand, gravel or stone from either or both sides.

The materials are mixed and carried down to the discharge end by gravity. The drum is set at an angle so that at each revolution of the materials they are carried down about two inches toward the discharge and as the drum is 60 inches long the materials are thus mixed thirty times. The mix is all dry in the upper end, water not being added until the last 18 inches. Inside the drum are steel blades $1\frac{1}{4}$ inches high that carry the material well toward the top of the drum before it is rolled back.

Cement enters through the center and sand, crushed rock or gravel through either or both sides of the three-compartment hopper. The constant stream of properly proportioned materials is calculated to insure a steady, uniform mix. The feed is controlled by an individual clutch and may be stopped on started regardless of the rest of the machine. If the shoveling is stopped the feed is thrown out



THE SIMPLEX CONTINUOUS MIXER.



THREE-COMPARTMENT HOPPER.

of gear by a clutch lever and if it is desired to empty the drum the feed may be stopped while the mixer continues its work. The materials are conveyed or forced into the mixing drum by three heavy conveyor chains, A, with scraper links, B or C. These chains are driven by three heavy sprocket wheels, H, mounted on a 1½-inch square steel shaft, G, which prevents slipping. All are traveling at the same speed and the adjustment at J of the steel brakes L for the sand or stone and the cement slide K and the feeding from either side allows a capacity of 100 yards in ten hours. M, N and O are the proportioning cams which are carefully machined and graduated and provided with a positive locking device consisting of a slotted slide P and a lock nut Q. The water supply is at all times under the control of the operator.

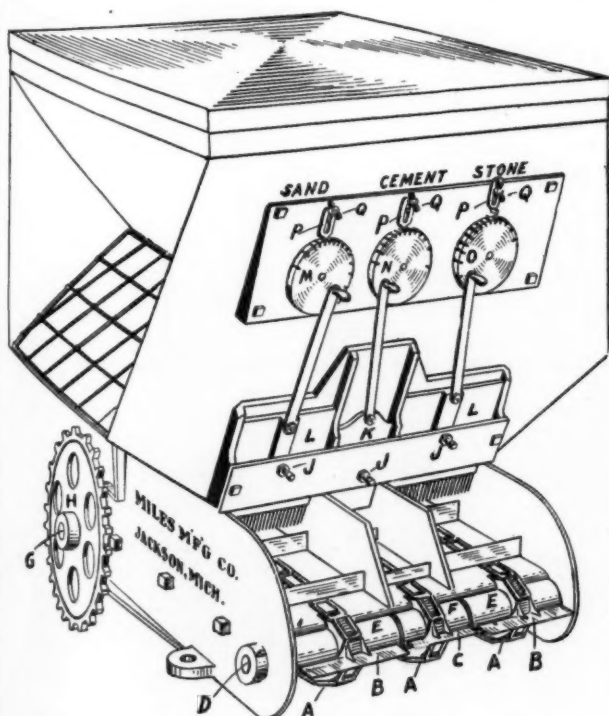
"Jackson," "Ideal" or "Novo," 2½ or 3 h.p. gasoline engines are used. The mixer may be had on skids or trucks, with or without power. The weight on trucks is 1,600 pounds and with bigger engine 2,000 pounds.

The Simplex mixers are made by the Miles Manufacturing Company, Jackson, Mich.

A GYRATORY RIDDLE.

A Power Machine for Contractors' Service.

At the recent Chicago Cement Show one of the exhibits of interest was the Coombs gyratory riddle, designed to displace the hand-operated riddle and save time and labor. The gyratory motion of the riddle gives it capacity and produces uniform quality of work. The riddle is portable, making it very convenient for contractors' service of all kinds.



FEED MECHANISM OF CONTINUOUS MIXER. R

The sieve is 24 inches in diameter and is held in place by a specially-designed spring clamping device that allows the operator to remove the sieve in an instant for cleaning and to quickly replace it. The machine is electrically driven by a motor requiring only one-third horse-power. The motor is placed at the top of the machine, away from the dust. All bearings are of high-grade material, of the ball-and-roller type and dustproof. Unlike other riddles, it is claimed, the whole riddle is all above the floor, no obstructions being underneath, and is always out of the way. It is suspended from a cross-beam, a crane hook or other support and the motor is attached to an electric lamp socket and is ready to operate.

The machine, it is claimed, will sift sand faster than one man can shovel into it, and the usual inefficiencies and time-wasting stops of hand labor are eliminated in its operation.

The riddle, which is shown in the accompanying illustration at work, is made by the Great Western Manufacturing Company, Leavenworth, Kan.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—The amount of pipe business reflects seasonal activity. The leading interest is low bidder for 600 tons at Mason City, Ia., for 1,600 tons at Cincinnati and 700 tons at Bloomington, Ind. Of the 2,600 tons to be bought at Los Angeles, 1,600 tons will go to the American Cast Iron Pipe Company, 1,000 tons remaining to be awarded. New lettings include 1,800 tons at Columbus, O., and 5,500 tons at Chicago. Quotations: 4-inch, \$32.50 to \$33; 6-inch and larger, \$29.50 to \$30; class A, 1 extra. Birmingham—Prices are firm, with an upward tendency. In some instances \$28 per ton is realized

for small sizes, while the differential of \$3 between 4-inch and 6-inch sizes is becoming fixed. Municipal inquiries have increased and bookings are sufficient to maintain operations. J. R. McWane, president of the American Cast Iron Pipe Company, is still in South America for trade extension purposes. Quotations: 4-inch, \$27; 6-inch and up, \$24; 16-foot lengths, \$1 extra. San Francisco—The past month's tonnage has been below expectations, but inquiries are increasing. Los Angeles took bids Feb. 25 for about 1,600 tons of sizes up to 12-inch, and San Rafael on March 6 for a small lot. Salt Lake City is in the market for about 1,000 tons. Quotations: 6-inch and over, \$35; 4-inch, \$38; class A, \$1 extra. New York—Boston has opened bids on about 2,500 tons, R. D. Wood & Co. being low bidders. The Warren Foundry & Machine Co. secured the award of 500 tons of 6 to 24-inch at Pittsfield, Mass. Atlantic City, N. J., is asking figures on a considerable quantity of pipe for high pressure service. Private buying continues quite active. A sharp advance would not be surprising. Quotations: 6-inch, class B and heavier, \$29.50; class A, \$30.50.

Lead.—Nearby lead is scarce. The leading interest appears to be anxious to restrain the market, while the independents are getting premiums for their products. Quotations: New York, 6.30 cents; St. Louis, 6.30.

The Studebaker Co., South Bend, Ind., made a very novel demonstration of one of its new oil heaters and distributors at the fifth annual convention of Highway Commissioners recently held at Madison, Wis. The weather was down at zero, but the heater worked day after day all through the week, handling the heavy oils with ease. As a result of this performance it is said that a number of these machines will go into service in Wisconsin this spring.



SIMPLEX BATCH MIXER.

The Mexican Petroleum Corporation, the Huasteca Petroleum Co., the Petroleum Transport Co. and The Caloric Co., on March 1 moved their offices from 52 Broadway to the Equitable Building, room 2805, 120 Broadway, New York City.

The Goodyear Tire & Rubber Co., Akron, O., announces that the American-La France Fire Engine Co., Elmira, N. Y., has delivered recently the following apparatus equipped with Goodyear cushion fire truck tires: One type 12 triple combination each, to Idaho Falls, Idaho, Knoxville, Tenn., and El Reno, Okla., one type 10 triple combination to Sayre, Pa., and one type 31 4-cylinder, 65 foot aerial truck to Annapolis, Md.

The Blaw Steel Construction Co., Pittsburgh, Pa., has published a very interesting illustrated booklet entitled "The Highest Concrete Water Tank in the World," describing the use of the Blaw steel forms in the construction of the 500,000 gallon concrete tank recently built for the city of Middleboro, Mass. The structure and the work is described in excellent detail and every stage is illustrated with photographs and drawings.

The Scherzer Rolling Lift Bridge Company, Monadnock Block, Chicago, Ill., announces that following the death of Albert H. Scherzer, president, the entire stock of the company has been purchased by a syndicate of its officials who have been connected with the business from its inception and that there will be no change in the personnel of the organization. Mr. Scherzer had taken no active part in the affairs of the company for several years.

The A. S. Cameron Steam Pump Works, 11 Broadway, New York, N. Y., has just issued for general distribution two new bulletins. Catalog 154 deals with Cameron centrifugal pumps, single and double suction open impeller types and sump pumps. Sectional views illustrate the descriptions of the machines and tables give the capacities and other data. Catalog 110 covers the Cameron line of Duplex pumps, including both piston and plunger types, with single and compound steam cylinders for all types of service, including waterworks.

The Society for Electrical Development, Inc., 29 West Thirty-ninth street, New York, has started another electrical campaign. It calculates that there are approximately 1,900,000 homes in this country adjacent to electric central station lines, but not wired for electric service, and as it is estimated that the annual income from the smaller residence customer amounts to \$12 per year, it is figured that there is a minimum of \$22,800,000 additional possible business per annum obtainable along existing lines. Accordingly, the movement has been started to get the

manufacturers, central station interests, jobbers, contractors and dealers busy to push a "wire your home" month from March 15 to April 15.

NEWS OF THE SOCIETIES

(Continued from page 349.)

Electric Vehicle Association of America.

At the direction of the Council a special meeting of the Association will be held Friday evening, March 10, 1916, in the Engineering Societies Building, 29 West 39th street, New York City, for the purpose of considering, and the active members voting on, the invitation of the National Electric Light Association that the Electric Vehicle Association of America affiliate with it as a section, to be known as the Electric Vehicle Section.

Michigan League of Municipalities.

The annual meeting of the Michigan League of Municipalities will be held at Battle Creek, June 28-30. The subjects to be discussed will include almost every phase of municipal government, while special talks are to be made by Governor Ferris on a subject he can choose himself; by David E. Heineman, of Detroit, on "Commission Form of Government," and by Professor David Friday, of the University of Michigan, on "Municipal Bonds."

Armstrong County Road Supervisors.

The third annual convention of the Armstrong County Road Supervisors will meet in Kittanning, Pa., on Thursday, March 9th, for an all day session. Addresses will be made by some of the foremost road builders of the district and state, among them State Highway Commissioner R. J. Cunningham. The convention will be called to order by J. W. Rickel, president, at half past ten. The following papers will be presented: "The Relations of the Individual to the State," J. Frank Graff; "Improvement of Township Roads as I Understand It," by the supervisors; "Road Maintenance," by a representative from the United States Bureau of Public Roads. Afternoon addresses are: "The Policies of the State Highway Department," R. J. Cunningham, State Highway Commissioner; discussion, "Road Drainage," by the Supervisors; "The Township Road Laws and Highway Organization," W. A. Wynn, Engineer Bureau of Township Highways; "How to Make Good Roads Day a Success," by Chas. M. Ketchum, Secretary Washington Board of Health; "Cooperation," by N. L. Strong; "The Business Men's Interest in Public Highways," by W. N. R. Copley.

Maine Society of Civil Engineers.

The annual meeting of the society was held at Augusta, February 2. The meeting was called to order at 10 a. m., with President Charles E. Mixer presiding. An important feature of the forenoon session was the paper upon "Weather Predictions," by Dean James S. Stevens of the University of Maine. The speaker declared that only one in seven of the government weather predictions failed to make good. He also said that long range weather predictions were impracticable and that annual predictions such as given in yearly almanacs were "all bosh."

The following officers were chosen at the afternoon session: President, Paul D. Sargent, Augusta; vice-president, Harry E. Green, Waterville; secretary and treasurer, F. E. Pressey, Bangor; directors—I. W. Barbour, John Calvin Stevens, F. A. Moulton, E. C. Jordan, Portland; Thomas W. Clark, Old Town.

An illustrated lecture upon "Road Building in Alaska" was given at the evening session. The various phases of workmen's compensation insurance and the new workmen's compensation law of Maine were explained by John E. Nelson, of Augusta.

Walter S. Wyman, treasurer of the Central Maine Power Co., took up "Electrical Industry Problems." Mr. Wyman pointed out to the engineers the importance of not letting theory run away with the practical conduct and development of the business. The engineer should aim to make his explanations so that they would be understood by the purchaser and not dazzle him with technical terms. The real problem of the engineer should be the finding of ways to reduce the cost of electricity to the public, he said.



COOMBS GYRATORY RIDDLE.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
N. Y.	Buffalo	11 a.m., Mar. 11	Paving several streets	A. W. Kreinheder, Supt. Pub. Works.
Ind.	Bluffton	Mar. 11	Constructing brick and asphalt streets and 15 miles stone road	C. T. Kain, Co. Auditor
Neb.	Omaha	Noon, Mar. 11	Grading 28,000 cu. yds.	Frank Dewey, Clk. Co. Commissioners.
Ill.	Rock Island	Mar. 11	Paving with brick; cost \$25,600	Wallace Treichler, City Engr.
Miss.	Pontotoc	Mar. 11	Constructing 28 miles of road	O. J. Knox, Ch. Hwy. Comrs.
Minn.	St. Paul	10.30 a.m., Mar. 13	Paving and curbing several streets	August Hohenstein, Pur. Agt.
R. I.	Providence	2.15 p.m., Mar. 13	Furnishing granite curbing and curb corners	W. C. Pelkey, Clk., Bd. Contr. & Supply.
O.	Shaker Heights	Noon, Mar. 13	Grading, curbing, paving and improving streets	B. W. Willard, Engineer, Marshall Bldg., Cleveland.
O.	East View	Noon, Mar. 13	Grading, draining, paving and improving streets	F. A. Pease Engineering Co., Marshall Bldg., Cleveland.
Neb.	Hastings	Mar. 13	Constructing 10½ ml. street pavement	City Clerk.
Ind.	South Bend	11 a.m., Mar. 13	Grading, paving and improving road	A. W. Wolf, County Aud.
Ida.	Wallace	Mar. 13	Street paving, estimated cost \$120,000	City Clerk.
Cal.	Ontario	Mar. 13	512,000 sq. ft. concrete pavement and 35,000 lin. ft. concrete curb	B. B. Mann, City Engr.
Ind.	Vincennes	Mar. 13	20,000 yds. of paving and 12,500 ft. concrete curb and gutter	H. T. Watts, City Engineer.
N. J.	Glen Ridge	8 p.m., Mar. 13	Furnishing and applying non-asphaltic road oil	John Brown, Boro Pres.
Mont.	Anaconda	8 p.m., Mar. 13	Constructing pavement (19,500 yds.) and curb	M. J. Kelly, City Clerk.
la.	Eagle Grove	7.30 p.m., Mar. 14	Laying 27,000 yds. concrete, asphalt or asphaltic concrete and 17,000 ft. of curb	A. Middleton, City Clerk.
Ind.	Fort Wayne	Mar. 14	Constructing macadam roads	Will Johnson, County Aud.
S. C.	Sumter	Mar. 14	Paving streets	City Clerk.
Ind.	Logansport	Mar. 14	Constructing 17,000 yds. first class pavement	H. H. Thompson, City Engr.
Wis.	Beloit	2 p.m., Mar. 14	97,000 sq. yds. first class pavement and 55,000 ft. combined curb and gutter	Public Works Commission.
Ill.	Danville	2 p.m., Mar. 14	Constructing 57 miles concrete and brick roads	J. R. Moore, Co. Clk.
S. C.	Sumter	Mar. 14	Street paving	D. M. Blanding, City Clerk.
Ont.	Brantford	noon, Mar. 14	Furnishing road oil	T. Harry Jones, City Engineer.
S. D.	Sioux Falls	Mar. 15	79,573 sq. yds. of paving	City Commissioners
N. Y.	New York	2 p.m., Mar. 15	Constructing stairway at 138th street	M. M. Marks, Boro President.
Cal.	Visalia	Mar. 15	Paving 14 blocks	L. F. McCabe, City Engineer.
la.	Forest City	Mar. 15	Laying 25,500 yds. of pavement and 16,500 ft. of curb and gutter	T. S. DeLay, Engr., Creston.
Tenn.	Winchester	noon, Mar. 15	Constructing 125 miles macadam road	Franklin County Hwy. Comn.
N. J.	Woodbridge	8.30 p.m., Mar. 15	Thirty carloads crushed trap rock	Andrew Keyes, Township Clk.
Ill.	Chicago	Mar. 15	Purchase of asphalt plant	South Park Comrs.
Ill.	Danville	2 p.m., Mar. 15	Constructing 57 miles concrete and brick roads	J. R. Moore, County Clerk.
Ill.	Danville	2 p.m., Mar. 15	Constructing 57 miles concrete and brick roads	J. R. Moore, County Clerk.
Texas	Aransas Pass	11 a.m., Mar. 16	Shelling 24 miles of road	J. K. Cain, Secy. Rd. Dist. No. 2.
la.	Monticello	3 p.m., Mar. 16	37,000 yds. paving and 8,000 ft. curb and gutter	C. J. Northrup, City Clerk.
Tex.	Sinton	Mar. 16	Placing shell on 24 miles of streets	C. E. Henry, Ch. County Comrs.
N. Y.	New York	3 p.m., Mar. 16	Furnishing grits, broken stone, sand and coal tar	Cabot Ward, Pres. Park Comrs.
N. Y.	Brooklyn	Mar. 16	Furnishing 180,000 gals. and 200 tons refined asphalt	L. H. Pounds, Boro President.
Ind.	South Bend	7.30 p.m., Mar. 17	Improving boulevard	A. P. Perley, Secy. Park Comrs.
N. Y.	Watertown	8 p.m., Mar. 17	Constructing creosoted wood block pavement	E. W. Sayles, City Engineer.
Ind.	Indianapolis	10 a.m., Mar. 18	Grading and paving several roads	L. K. Fesler, Co. Aud.
Ind.	Washington	10 a.m., Mar. 18	Grading, paving and improving road	J. G. Clark, Co. Aud.
Ind.	Muncie	10 a.m., Mar. 18	Constructing stone road	S. M. Williams, County Auditor.
Tex.	El Paso	10 a.m., Mar. 18	Constructing concrete road	C. S. Hennings, County Engr.
Ind.	Columbus	10 a.m., Mar. 18	Grading, paving and improving road	W. H. Scott, County Auditor.
N. D.	Minot	Mar. 20	Constructing 24,844 yds. pavement	A. D. Hagenstein, City Aud.
Minn.	Glenwood	2 p.m., Mar. 20	Road construction, cost \$18,100	Ole Irgens, County Auditor.
Wash.	Montesano	Mar. 20	Constructing road, estimated cost \$24,000	Geo. D. Robertson, Co. Engr.
Mo.	Bolivar	Mar. 20	Constructing 10 miles oiled gravel roads	G. M. Upton, Secy. Road Dist.
Fla.	Deland	2 p.m., Mar. 20	Improving 45 miles of road, including 285,807 yds. of pavement and 378,532 ft. of curb	J. B. McCrary Co., Engrs., Atlanta, Ga.
Mich.	Marshall	noon, Mar. 20	Constructing 2 miles 16-ft. concrete road	Alexander McKay, County Engineer, Battle Creek.
Kans.	Kansas City	Mar. 20	Grading and macadamizing road	F. M. Holcomb, County Clerk.
Wash.	Olympia	Mar. 20	Surfacing 7½ miles with gravel or macadam	W. R. Roy, St. Hwy. Comr.
Wash.	Pomeroy	10 a.m., Mar. 20	Constructing road	R. W. Riggsby, County Engr.
Minn.	St. Paul	10 a.m., Mar. 20	Two miles of clay and gravel road	G. J. Ries, County Aud.
Minn.	Redwood Falls	1 p.m., Mar. 21	Grading, gravelling and improving 6 miles of road	L. F. Larson, County Aud.
Ark.	Eldorado	Mar. 21	24,500 yds. concrete or asphalt concrete	John MacCrea, Engr., Little Rock.
Minn.	Marshall	2 p.m., Mar. 21	Constructing gravel road; cost \$19,975	E. S. Shepard, County Auditor.
O.	Cuyahoga	Mar. 22	Improving several roads	Board of Commissioners.
Ala.	Rockford	1 p.m., Mar. 22	Grading and top-solling 5 miles of road	Lofton Thomas, Probate Judge.
O.	Lorain	noon, Mar. 22	Draining, curbing and paving with brick or asphalt (17,800 yds.)	C. M. Osborn, City Engineer.
O.	Cleveland	Mar. 22	Paving and improving roads	E. G. Krause, Clk. Co. Comrs.
N. J.	Flemington	Mar. 23	Constructing 3½ miles waterbound macadam	Grant Davis, Engr., Whitehouse Station.
Ala.	Lafayette	Mar. 23	Constructing 28 miles sand-clay roads	J. J. Robinson, Jr., Probate Judge.
N. J.	Flemington	Mar. 23	Macadamizing roads	Boro Clerk.
Tex.	Houston	Mar. 24	Constructing pavement on Harrisburg Road	County Commissioners.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Wis.	Racine	10 a.m., Mar. 25	Paving streets—seven jobs	Board of Public Works.
Fla.	Deland	Mar. 25	Constructing 36 miles of road	M. M. Bond, Ch. County Comr.
Minn.	Winona	8 p.m., Mar. 27	Furnishing 10-ton road roller and dustless pick-up street cleaner	Geo. Hofmann, City Recorder.
N. J.	Bayonne	Mar. 28	Asphalt, bituminous concrete and granite block pavement; cost, \$200,000	W. L. Clarkson, City Engr.
S. C.	Sumter	Mar. 28	Street paving; cost \$225,000	W. L. Lee, City Engineer.
O.	Columbus	noon, Mar. 28	Grading, curbing and paving road	John Scott, Clerk, Co. Comrs.
N. Y.	Albany	1 p.m., Mar. 28	Furnishing bituminous material "A" and "T" and cold patch emulsion	Edwin Duffey, St. Hwy. Comr.
W. Va.	Morgantown	Mar. 30	Constructing brick and concrete road	W. S. Downs, Engineer.
N. D.	Steele	Mar. 30	Grading county road	J. C. McWhinney, Co. Auditor.
Wis.	Waukesha	2 p.m., Mar. 30	Constructing 11,000 yds. asphalt macadam; cost, \$15,000	William Pourie, City Engineer.
Wash.	Pomeroy	Apr. 1	20,000 yds. pavement and 7,600 ft. curb and gutter; cost, \$75,000	J. E. Tupper, City Engineer.
Tenn.	Morristown	Apr. 1	Constructing roads, cost \$150,000	H. B. Havely, Engineer.
W. Va.	Charleston	Apr. 1	16,000 yds. brick pavement	J. N. Clark, City Engr.
N. D.	Mandan	10 a.m., Apr. 2	Concrete mixer, scrapers, graders and road ploughs	Lee Nichols, County Auditor.
S. D.	Huron	Apr. 3	Paving Dakota Avenue	S. S. Oviatt, City Auditor.
N. D.	Sherbrooke	2 p.m., Apr. 3	Constructing roads	G. J. Mustard, County Auditor.
Mass.	Revere	Noon, Apr. 3	Constructing 4,500 sq. yds. granolithic sidewalk	C. G. Richmond, Supt. Public Works.
W. Va.	Huntington	Apr. 6	Paving 10 miles with brick	Oliver & Maupin Engrs. Co.
Ark.	Jonesboro	2 p.m., Apr. 6	13 miles asphalt road on gravel base and 3 miles gravel road	Lund & Hill, Engineers, Little Rock.
O.	Cincinnati	noon, Apr. 7	Setting granite curbs, paving with asphalt and constructing drains and inlets	Frank Krug, City Engineer.
O.	Batavia	Apr. 15	Constructing three miles of pavement	L. H. Lersh, Engineer, State Hwy. Dept., Columbus.
Ala.	Lafayette	Apr. 24	Constructing 16 miles sand-clay roads	J. J. Robinson, Jr., Probate Judge.
O.	Gallion	May 1	Paving Grove Avenue; cost \$30,000	A. F. Unckrich, Dir. Pub. Serv.
Minn.	Eveleth	May 1	Paving streets; estimated cost \$20,000	C. H. Williams, City Clerk.
SEWERAGE				
Wis.	Racine	10 a.m., Mar. 11	Constructing 9,300 ft. 8 to 16-in. tile drain	P. J. Hurtgen, Engineer, Burlington.
Ind.	Peru	Mar. 11	Ditch, requiring 9,200 ft. 16 to 20-in. tile, etc.	E. O. Deeds, Drainage Comr.
Minn.	Blue Earth	1.30 p.m., Mar. 11	Constructing three tile ditches	J. L. Herring, Co. Aud.
Wis.	Racine	Mar. 11	Constructing sewers in ten streets	City Engineer.
Ont.	Brantford	noon, Mar. 13	Furnishing sewer pipe	T. Harry Jones, City Engineer.
Ind.	Vincennes	Mar. 13	Laying 530 ft. 8 to 15-in. sewer, 4 manholes and 16 inlets	H. T. Watts, City Engineer.
Minn.	St. Paul	10.30 a.m., Mar. 13	Constructing Capitol avenue sewer system	August Hohenstein, Pur. Agt.
O.	Shaker Heights	Noon, Mar. 13	Constructing storm and sanitary sewers	B. W. Willard, Engineer, Marshall Bldg., Cleveland.
O.	East View	Noon, Mar. 13	Constructing storm sewers and catch basins	F. W. Pease Engineering Co., Cleveland.
Mont.	Anaconda	8 p.m., Mar. 13	Constructing storm sewers	M. J. Kelly, City Clerk.
Wis.	Oshkosh	2 p.m., Mar. 14	Sewers in several streets	E. A. Hollister, Ch. Bd. Pub. Works.
N. J.	Newark	Mar. 14	Constructing 2,700 ft. Passaic Valley trunk sewer	Passaic Val. Sew. Commission
Mo.	Doniphan	9 a.m., Mar. 14	Constructing drainage ditches, requiring 400,000 cu. yds. excavation	J. H. Greason, Engineer, Drainage District No. 3.
Ia.	Fort Dodge	1 p.m., Mar. 14	Constructing tile drainage ditch	B. S. McCully, Co. Aud., Jefferson.
Ia.	Clarion	noon, Mar. 14	Constructing ditch	F. E. Osler, Co. Auditor.
Mich.	Flint	10 a.m., Mar. 14	Constructing 1½ miles 6 to 14-in. tile drain	A. H. Reid, Co. Drain. Comr.
Ia.	Union	2 p.m., Mar. 14	Constructing sanitary sewer	H. L. Cartwright, Town Clerk.
N. J.	Manasquan	8 p.m., Mar. 14	900 ft. 10-in. wrought iron ocean outfall	Ralph E. Bush, Boro. Clerk.
Wis.	Oshkosh	2 p.m., Mar. 14	Constructing sewers in several streets	G. H. Randall, Bd. Pub. Wks.
N. Y.	Buffalo	11 a.m., Mar. 15	Constructing 10 to 15-in. sewers	A. W. Kreinheder, Supt. of Public Works.
O.	Mansfield	noon, Mar. 15	860 ft. 8-in. sewer, manholes, etc.	O. Hursh, Dir. Public Service.
Ind.	Logansport	Mar. 15	Constructing sewer, estimated cost, \$270,000	H. H. Thompson, City Engr.
Mont.	Malta	2 p.m., Mar. 15	Constructing canal, Milk river project	U. S. Reclamation Service.
N. J.	Newark	3.30 p.m., Mar. 15	Constructing sewers in several streets	M. R. Sherrerd, Chief Engr.
O.	Cleveland	noon, Mar. 16	Constructing sewers in 8 streets	Comrs. of Purchase & Supplies.
N. Y.	Brooklyn	11 a.m., Mar. 16	Constructing sewers; estimated cost \$6,300	L. H. Pounds, Boro. President.
Minn.	Olivia	1 p.m., Mar. 20	Digging and constructing three tile ditches; cost \$38,000	J. A. Dahlgren, Engineer, Hector, Minn.
Minn.	St. Paul	11 a.m., Mar. 20	Constructing ditch, including highways and bridges	J. A. O. Preus, State Auditor.
Minn.	Canby	8 p.m., Mar. 20	Constructing 950 ft. sewer	J. H. Gehbauer, City Engineer.
Minn.	Olivia	2 p.m., Mar. 20	Constructing four county ditches	J. L. Johnson, Co. Aud.
Minn.	Gaylord	1 p.m., Mar. 20	Constructing drainage ditch	Fred Hoppenstedt, Co. Aud.
Utah	Salt Lake City	10 a.m., Mar. 20	Constructing reinforced concrete siphon	Thomas Homer, County Clerk.
Minn.	Ely	8 p.m., Mar. 21	Constructing concrete coagulation and settling tank	Arthur Knutson, City Clerk.
O.	Columbus	Mar. 21	6,200 ft. 42 and 84-in. sewer, manholes, outlet, etc.	G. A. Borden, Dir. Pub. Serv.
Ill.	Springfield	10 a.m., Mar. 21	Constructing sewage treatment plant at St. Charles School	W. S. Shields Co., Hartford Bldg., Chicago.
Mont.	Harlem	2 p.m., Mar. 22	Sewer extension at Fort Belknap school	Supt. of School.
Neb.	Lincoln	2 p.m., Mar. 22	Constructing refuse disposal plant; cost, \$30,000	T. H. Berg, City Clerk.
Mont.	St. Ignatius	Mar. 23	Reclamation work, including 3,000 ft. vitrified pipe	U. S. Reclamation Service.
N. Y.	Batavia	Mar. 23	Constructing sewage pumping station	I. J. Carmichael, City Clerk.
Minn.	Jackson	1 p.m., Mar. 23	Constructing 3 tile and open ditches; cost \$8,950	P. D. McKellar, County Aud.
Wis.	Randolph	2 p.m., Mar. 27	Constructing 16,300 ft. 8 to 12-in. sanitary sewers, 60 manholes, 4 flush tanks, 1,370 ft. 8-in. c.i. pipe and 1 sewage disposal plant	W. S. Shields, Engineer, Hartford Bldg., Chicago.
Conn.	Salisbury	8 p.m., Mar. 27	Laying 22,900 ft. 8 to 15-in. vitrified sewers, 1,900 ft. 8 to 14-in. c. i. sewers and sewage disposal plant	A. C. Roberts, Ch. Sewer Comr., Lakeville, Conn.
O.	Ada	Apr. 1	Constructing sewers; cost about \$40,000	T. J. Smull, City Engineer.
Wis.	N. Milwaukee	Apr. 1	Constructing sewer system; cost \$14,000	H. C. Webster, Engineer.
Ill.	Mattoon	Apr. 1	6,100 ft. 24 to 30-in. tile	C. L. James, Engineer.
Ia.	Wall Lake	Apr. 1	Straightening and deepening river and draining swamp	Seth Dean, Eng., Glenwood.
Mich.	Macon	Apr. 1	Constructing branch of Macon drain	D. S. Sullivan, Co. Drain Comr.
Wis.	Sheboygan Falls	Apr. 1	Constructing 2 miles 8 to 15-in. sewer in eight streets	F. R. Kroeger, City Clerk.
Mont.	Billings	Apr. 4	9,670 ft. 18 to 54-in. concrete and pipe sewer, cost \$66,350	E. M. Sneckenberger, City Engr.
Ill.	Madison	Apr. 10	35,000 ft. tile sewers, cost \$155,000	W. Champion, Secy. Bd. Local Improvements.
Argentina	Buenos Aires	Apr. 24	Furnishing machinery	Dept. Obras Sanitarias de La Nacion.
Tex.	Amarillo	May 1	Sewer system and disposal plant; cost \$10,000	M. H. Hardin, City Engineer.
N. J.	Lyndhurst	May 20	Constructing sewers; cost \$200,000	Bowe & Wessells, Engineers, Rutherford.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
WATER SUPPLY				
Ill.	Kewanee	Mar. 11	Drilling and completing artesian well	City Clerk.
O.	East View	Noon, Mar. 13	Constructing watermains in several streets	F. A. Pease Engineering Co., Cleveland.
O.	Shaker Heights	Noon, Mar. 13	Constructing watermains	B. W. Willard, Village Eng., Marshall Bldg., Cleveland.
Neb.	Crofton	2 p.m., Mar. 14	Laying 5,686 ft. 4-in. pipe, 13 hydrants and 8 gate valves, cost \$5,360	J. D. Clair Smith, Engr., Hartington.
N. C.	Wilson	Mar. 15	Constructing waterworks system, cost \$95,000	City Clerk.
Ill.	Fairbury	Mar. 15	Drilling and casing artesian well	T. W. Burns, Engr.
Ind.	Fort Wayne	10 a.m., Mar. 15	Installing electric deep well tank pump	Will Johnson, Co. Auditor.
Mich.	Escanaba	Mar. 15	Constructing water works system; estimated cost \$400,000	Burns & McDonnell, Engrs., Interstate Bldg., Kansas City, Mo.
O.	Cleveland	noon, Mar. 15	Furnishing c. i. pipe and special castings	A. R. Callow, Comr. Purchases & Supplies.
Que.	Drummondville	7 p.m., Mar. 15	Constructing pumping station and mechanical gravity filters	W. A. Moisan, Town Clerk.
Ont.	London	Mar. 15	Constructing water mains, cost \$18,500	Philip Pocock, Ch. W. W. Bd.
Utah	Salt Lake City	Mar. 15	Constructing water main extensions, cost \$33,000	Gordon Snow, City Recorder
N. J.	Atlantic City	Mar. 16	Furnishing gate and check valves	Harry Bacharach, Dir. Parks and Pub. Property
Tex.	Houston	Mar. 16	Pumps, motors and Diesel engines	E. E. Sands, City Engr.
N. Y.	New York	2 p.m., Mar. 16	Furnishing c. i. pipe, specials, valves and double nozzle fire hydrants	William Williams, Commissioner W. S. G. & E.
D. C.	Washington	Mar. 17	Iron and steel castings, tubing, pipes, valves, etc.	General Purchasing Officer, Panama Canal
Ill.	Wheaton	Mar. 18	Internal combustion engine	L. J. Ruddock, City Engr.
Mont.	Fort Shaw	2 p.m., Mar. 20	Constructing 575 ft. 96-in. wood stave pipe	U. S. Reclamation Service.
Mont.	Polson	Mar. 20	Constructing water works system	F. F. Faucet, Engr.
Minn.	Chisholm	Mar. 20	Furnishing 6,000 ft. 6-in. c. i. pipe	C. J. Sullivan, Supt. of Water.
Ore.	Florence	Mar. 20	Sinking well and building pump house	D. E. Severy, City Recorder.
Minn.	New Ulm	Mar. 20	Postponed date for bids on pump head, etc.	F. D. Minium, City Eng.
N. Y.	New York	Mar. 21	Constructing buildings (brick and granite)	Board of Water Supply
La.	New Orleans	Noon, Mar. 22	Constructing addition to pumping station	G. G. Earl, Gen. Supt. Water & Sewer Bd.
Pa.	Lancaster	noon, Mar. 22	Furnishing centrifugal pumping machinery	Harry Dean, Clerk.
N. Y.	Batavia	Mar. 23	Water works pumping station and filtration plant	I. J. Carmichael, City Clerk
Kan.	Emporia	10 a.m., Mar. 24	Furnishing valves, constructing steel tank and tower, mechanical filters and plant, and building pipe line extensions	Black & Veatch, Engrs., Interstate Bldg., Kansas City, Mo.
Fla.	Lakeland	Mar. 27	Building water reservoir for water and electric power station	City Clerk.
O.	Euclid	Noon, Mar. 27	Constructing 10-in. water main	H. S. Dunlop, Village Clk.
N. C.	Wilson	Mar. 27	3,000,000 gal. filter plant, 1,000,000 gal. reservoir, remodeling building and improving waterworks	E. F. Killette, Mayor.
Va.	South Boston	Mar. 30	Constructing filtration plant and pumping station	Anderson & Christie, Inc., Engrs., Charlotte, N. C.
Fla.	Ocala	Mar. 30	Constructing electric light and power plant and water system	H. C. Sistrunk, City Clerk.
Ont.	Marys	Mar. 31	Furnishing 2,000,000-gal. pump	H. M. Miller, Supt. of W. Wks.
Sask.	Moose Jaw	noon, Apr. 1	Excavating reservoir	T. C. MacNabb, Div. Engr., C. P. R.
Ala.	Cullman	Apr. 1	Laying 2 miles of 6-in. water mains; cost \$12,000	A. G. Coe, City Clerk.
N. D.	Langdon	2 p.m., Apr. 3	Drilling and casing 6-in. well	Ole J. Elde, County Auditor.
Ala.	Florence	Apr. 15	Constructing filtration plant and pumps	C. E. Jordan, Comr. Pub. Prop.
MISCELLANEOUS				
Fla.	Jacksonville	8 p.m., Mar. 13	Constructing reinforced concrete unloading platform	S. C. Harrison, Jr., Chm., Bd. of Bond Trustees.
D. C.	Washington	Mar. 13	Constructing postoffice at Oklahoma, Okla.	J. A. Wetmore, Supv. Archt.
D. C.	Washington	2 p.m., Mar. 14	Furnishing one to three-ton electric motor trucks	A. S. Burleson, Postmaster General.
O.	Mansfield	noon, Mar. 15	Constructing garbage crematory	O. Hursh, Dir. of Pub. Serv.
Md.	Baltimore	11 a.m., Mar. 15	Removal and disposal of street sweepings and other refuse	W. A. Larkins, Comr. St. Clean.
N. Y.	Port Jervis	5 p.m., Mar. 15	Collecting and removing ashes and garbage for one year	J. F. Cleary, City Clerk
N. Y.	New York	2 p.m., Mar. 15	Painting reservoir fences and bridges	William Williams, Comr. W. S. G. & E.
D. C.	Washington	Mar. 17	Constructing postoffice at Charles City, Ia.	Supervising Architect, Treasury Department.
N. J.	Perth Amboy	Mar. 20	Removing garbage	Board of Aldermen.
Pa.	Pittsburgh	Noon, Mar. 21	7,000 bbls. Portland cement	J. G. Chalfant, County Engr.
Neb.	Lincoln	Mar. 22	Constructing refuse disposal plant, estimated cost, \$30,000	T. H. Berg, City Clerk.
Ind.	Vincennes	3 p.m., Mar. 23	Constructing 37 miles of levees	J. F. Spiker, Construction Comr., Noble Block.
D. C.	Washington	Mar. 24	Constructing postoffice at Taylorville, Ill.	Treasury Dept.
Pa.	Wilkes-Barre	noon, Mar. 24	Cleaning 45 miles of paved streets	M. C. Murray, Supt., Streets and Public Improvements.
Cal.	San Diego	11 a.m., Mar. 31	Furnishing portland cement, sand and crushed stone	U. S. Engineer's Office, Los Angeles.

STREETS AND ROADS

Fort Smith, Ark.—Ordinance creating Paving District No. 11 was read three times and passed unanimously by city commission at its adjourned session Feb. 26. Ordinance provides for repaving of Sixth St. from Rogers Ave. to North I St.

Texarkana, Ark.—Engineer C. E. Hayden of West Side, who has been appointed by commissioners to conduct surveys of seven miles of Pace Ferry Rd., to be constructed under \$15,000 contracts recently let. He has run lines for about three miles of the road up to present and expects to finish that job shortly. When all has been completed, plans and estimates of material will be given, and work begun as stated.

Phoenix, Ariz.—Two bids were received for the proposed paving of West Washington St., 17th Ave. and South Central Ave. One from Ledingham & Cooper on three classes of paving, together with bids for curbing, gutters, etc., which are included in proposed improvement, and another from California-Arizona Construction Co., on 7 classes of paving, as well as curbing, gutters, etc. Bid of Ledingham & Cooper was as follows: Topeka specifications with concrete base, \$1.82½ per square yd.; tarvia, \$1.29½; Topeka with asphalt concrete base, \$1.47. That of the California-Arizona Construction Co. was as follows: Bitulithic with concrete base, \$2.12; bitulithic, asphalt concrete base, \$1.50; concrete, \$2.30; Topeka with concrete base, \$1.75; Bitu-

stone, \$1.50; tarvia, \$1.25; Topeka, asphalt concrete base, \$1.28. Until the figures submitted for extra work can be figured out it will be impossible to determine just which are the low bids and no recommendation of an award will be made until these figures have been gone over.

Los Angeles, Cal.—County will unite with El Segundo and other interests in construction of proposed coast line boulevard between Redondo and Hermosa beaches and Santa Monica Bay district, estimated cost of improvement being \$52,000. M. L. McCray, president and S. McLean, secretary of El Segundo Land & Improvement Co., have signed contract for boulevard improvement, as has also Centinella Land Co., while Standard Oil Co. will donate right of way for that

portion of boulevard traversing Standard Co. holdings. Scenic boulevard will be about four miles in length and cost per mile will approximate \$13,000.

Redwood City, Cal.—Right of way for state highway through property of Asa Hull, at San Carlos, was secured at an executive conference between Hull and the supervisors. This is one of most important steps toward completion of highway between Beresford and Redwood City, and with this right of way secured it is believed that state highway commission will order bids for work within next few weeks.

Sacramento, Cal.—Council has adopted resolution for improvement of K St. and 15th St. by curbing, draining and guttering.

Sacramento, Cal.—Council has ordered improvement of Third St. and 15th St. by curbing, guttering and draining.

Santa Ana, Cal.—City will vote May 3 on bond issue of \$35,000 for repair of roads; \$15,000 will be used in Santa Ana canyon, \$10,000 in Santiago canyon, \$5,000 on paved roads and \$5,000 in various lesser repair work on highways.

Kissimmee, Fla.—Commissioners will call election for some time in April at which qualified freeholders in county, except in Third commissioner's district, will vote on plan to create special road and bridge district of that part of the county and upon further plan to issue \$250,000 in bonds for purpose of making road improvements. Third district has already petitioned for and been granted holding of election to create separate road and bridge district and to vote \$150,000 in bonds to build sand asphalt road from canal between St. Cloud and Kissimmee to Brevard county line to join road through that county to East Coast. This will give Osceola county \$400,000 in good roads money.

Rome, Ga.—T. E. Grafton, chief engineer of the Dixie highway, accompanied by H. A. Wheeling, secretary of forest highway association, are in Brewton, Ala., where good roads meeting is being held. Purpose of meeting is to discuss an extension of Forrest highway from Birmingham to Mobile.

Averyville, Ill.—Board of local improvements of village of Averyville was authorized at meeting Feb. 14 to advertise for bids for paving of Galena Rd. and work will be begun early in spring. Sum of \$23,000 is available for improvement.

Freeport, Ill.—New highway is proposed for Northern Illinois and Southern Wisconsin, to be known as Link Highway. Its purpose is to connect up with system of highways already existing and with others that are planned. Link Highway is to connect Freeport and Beloit, touching many important towns between two cities.

Fulton, Ill.—Organization of scenic highway from Fulton to Hampton, Ill., was begun by delegates from various cities along proposed route at special meeting in Moline recently and it is expected that definite plans will be made during March for mapping and charting of new road. Permanent organization was completed with J. W. Simonson, of Port Byron as chairman and Frank McNally, of Albany, as secretary. Delegates took up matter of plans for project, and it was decided that delegates should go over road for purpose of deciding on curves to be eliminated and fills to be made before employing of a surveyor.

Geneva, Ill.—Meeting of Illinois road builders was held here Feb. 28 to discuss plans for extensive paving for 12 counties of northeastern Illinois.

Peoria, Ill.—Plans are being discussed for resurfacing Fulton St. from Adams to Franklin with asphalt after leveling it by filling up depressions in brick with cement or paving with creosote block.

Quincy, Ill.—Question of resurfacing Jersey St. from 14th to 16th, was discussed with Contractor Reese. Board passed resolution favoring resurfacing of two blocks with tarvia, contractor to pay cost of repairing street itself, and city and property owners pay for cost of spreading new coat of tarvia. Street was recently paved, but the crown has been broken in some places. It is probable agreement as outlined above will be carried out. Board will advertise for bids for unconstructed sidewalks on north side of Washington St., between 14th and 15th; east side of 17th St., between Spring and Oak; west side of 10th St., south of Chestnut; south side of Hampshire St., from 9th to 10th; both sides of Maine St., between 3d and 4th.

Springfield, Ill.—Specifications for three strips of paving are being prepared by City Engineer Wade Seeley for submission to board of local improvements within a week or 10 days. Petition has been submitted to Commissioner. Hamilton's department for brick pavement in State St., between Lawrence Ave. and Canady St. Improvement will cost about \$4,000. Petition has also been presented for paving of Capitol Ave. from 19th St. to city limits. Engineer's department is also preparing specifications for paving of Peoria Rd. from 8th St. to Sangamon Ave. Opposition is being encountered to this last paving proposition.

Sterling, Ill.—Board of local improvements has voted to go on with paving system in Second Ave. at estimated cost of \$122,000. Work on ordinance governing same will be started at once.

Sterling, Ill.—Assistant state engineer, who has been in Whiteside county taking surveys for roads in Geneseo and Monticore townships where state and county money is to be expended this summer, has completed his work. As soon as estimates can be made of work, it will be advertised and lowest and responsible bidder will have contract. It is thought actual work will start in early spring so as to be completed by fall. About \$27,000 is to be expended in two townships. With use of gravel, macadam and cement binder, roads will be in number one condition.

Virginia, Ill.—Morgan St. will be paved at cost of \$10,000. Work will begin as soon as weather permits.

Bedford, Ind.—County Treasurer Short sold \$11,500 worth of Shawswick township and \$14,000 worth of Marion township gravel road bonds, a total of \$25,500, to J. F. Wild & Co., of Indianapolis, at premium of \$231 and \$282.50 respectively. Bonds run for 10 years and bear 4½ per cent. interest. There were four bidders.

Columbus, Ind.—A \$21,600 issue of Bartholomew County 10-year 4½ per cent. free gravel road bonds was sold here as follows: Lyman Boyer, \$6,000, premium \$110; Fenoleon M. Taylor, \$7,200, premium \$129; Freeman Gilliland, \$8,400, premium \$150. Total premiums, \$339.

Indianapolis, Ind.—Board of public works has requested City Engineer Jeup to prepare resolutions proposing paving of several streets in the northeastern part of Indianapolis as follows: Ashland Ave., from Fall Creek Blvd. to Maple road; Bellefontaine St., from Fall Creek Blvd. to Maple road; Birchwood Ave., from 34th St. to Maple road; Evergreen Ave., from 34th St. to Fairfield Ave., and Winthrop Ave., from 34th St. to Watson road.

Kokomo, Ind.—Petitions for Thomas Rd., which connects with Sellers farm, at Center Twp. line, near Alto, have asked members of Kokomo chamber of commerce to assist them in trying to get specifications for road changed so it will be asphalt instead of stone. Road is to be sold within a few days. James L. Stewart, county commissioner, said that only way this could be done would be to reject all bids and then have viewers change their report. These petitioners also asked that citizens of Center Twp. petition for asphalt road from end of Water St. to Thomas Rd. It developed that petition is being circulated for this road, calling for one of three kinds of pavement—brick, concrete or asphalt. W. H. Arnett, secretary of chamber of commerce, said recently that commissioners would be asked to grant petitions which will be filed shortly for a road starting at Phillips St. bridge and one south on Pumpkin Vine Rd., another one north on Kennedy St. and one south on Ricketts Pike. There is still \$56,427.80 in Center Twp. road fund this year.

Mishawaka, Ind.—St. Joseph county commissioners Feb. 28 asked for bids for construction of Beebe road southeast of Mishawaka. H. W. Reed & Sons, contractors, was only firm to bid for road, and that bid was held secret pending readvertisement of road and possibility of more bidders. Estimated cost of the road is \$18,613. This amount is said to be low, in view of advance in cost of road materials since last year. Auditor Arthur Wolf will readvertise for bids immediately.

Muncie, Ind.—Estimates for \$66,969.22 worth of public improvements were submitted by City Engineer B. F. Deardorff to special committee of city council Feb. 27 at regular session. Practically all estimates are for improvement of downtown business streets. Public hearing on these improvements will be held on

March 7 and at that time property owners may remonstrate against them if they so desire. Following is list of estimates submitted: Alley between Seventh and Eighth Sts., from Walnut to Jefferson Sts., \$1,257.75; construction of Elliott St. sewer from Powers to Howard St., \$677.84; Charles St. improvement from High to Mulberry Sts., \$5,615.50; value of abutting property \$155,820; improvement of Howard St. from High to Elm Sts., \$8,704.02; improvement of Adams St., from High to Walnut Sts., \$2,145; value of abutting property, \$91,550; improvement of Washington St. from High to Mulberry Sts., \$5,720; improvement of Gilbert St. from High to Walnut Sts., \$2,172.50; improvement of High St. from Charles St. to White River, excepting from Jackson to Washington Sts., \$14,809.67; construction of Penn St. sewer from Willard to alley north of Second St., \$809.70; improvement of Powers St. from Kilgore Ave. to Liberty St., \$16,994.24.

Muncie, Ind.—Merchants National Bank of this city was successful bidder for \$14,000 issue of Lawrence county road bonds and for \$13,400 issue of Clay county road bonds. Local institution paid premium of \$302.85 on first issue and premiums of \$277.85 on second.

South Bend, Ind.—Board of public works will order improvement of Pokagon St. by grading and graveling.

Britt, Ia.—Resolution was introduced by town council providing for construction of about 50,000 yds. of street paving and 30,000 ft. of curbing. Various types of pavement are under consideration. Further action will be taken March 24. Jas. E. Verrall is Town Clerk and Theo. S. DeLay, of Creston, Ia., is Town Engineer.

Denison, Ia.—Movement is on foot to ask voters of Crawford County to authorize issuing of bonds to make permanent graveled roads. Joint meeting of the board of supervisors and members of Denison Commercial Club was held Feb. 24. County Engineer Fishell made comprehensive address illustrated with views of road work done in this county. He made the claim that for \$2,000 per mile good gravel roads could be made which could be kept in order with little expense.

Fort Madison, Ia.—Following bids were received March 1 for 20,921 sq. yds. brick pavement and 18,043 sq. yds. concrete pavement with 4-in. concrete foundation for brick, 12,480 cu. yds. dirt and sand excavation: Burlington Const. Co., Burlington, Ia., at \$1.86 per sq. yd. for paving, 40 cts. per cu. yd. excavation, total \$42,133.06. Keokuk Quarry & Const. Co., Keokuk, Ia., at \$1.24 per sq. yd. for paving, 39 cts. per cu. yd. excavation, total \$22,655.92.

Oskaloosa, Ia.—Board has rejected bids for cement for construction work and will readvertise shortly for bids.

Perry, Ia.—Council ordered 30,000 yds. pavement for this season, to be asphaltic, brick, block or concrete. Chas. E. Wilson is engineer.

Topeka, Kan.—One hundred forty bonds, aggregating \$97,000, issued for paving purposes, were registered with W. E. Davis, state auditor, Feb. 24, by the City of Newton.

Barbourville, Ky.—Harlan County will expend \$200,000 in building roads this year.

Hopkinsville, Ky.—Good roads bureau of United States Department of Agriculture has granted request of officials of Christian county to send Government expert here to make general inspection of roads of county with view to furnishing complete data for system of macadam roads which will be built in event that proposed \$400,000 bond issue carries on March 18. J. A. Whitaker, experienced road man, who has general charge of Government work in Kentucky and part of Tennessee, has been detailed to make inspection here. He will begin work here March 6.

Louisville, Ky.—Plans are being discussed for improvement of Market St. by paving with brick or sarco macadam.

Morganfield, Ky.—Street bonds issued for improvement of Main St., from Townsend to Roberts, to amount of \$6,754, were sold to local persons, no others bidding. They were sold at par. These bonds run for 10 years at 6 per cent.

Pikeville, Ky.—Special election will be held in Pike County on May 6 to determine whether county will be bonded to extent of \$500,000 for building of good roads.

Amite City, La.—Police jury of Tangipahoa parish has created road district out of Sixth ward and has called election

in that district to vote on question as to whether or not bond issue of \$110,000 will be authorized for road purposes. State highway department has pledged aid for north and south road, which will leave \$30,000 of bond issue available for construction of east, west and cross roads.

Lafayette, La.—Police jury has accepted the plans for building five miles of gravel road 16 ft. wide in Fifth ward, state to contribute \$8,000 and citizens \$25,000. Road will be constructed under supervision of State Highway Engineer Atkinson.

Portland, Me.—Bids for construction of last remaining section of State highway between Portland and Portsmouth were opened at office of state highway commission at Augusta, Feb. 23, but owing to the great number of bids submitted, as well as great number of subdivisions presented, it was impossible to make awards until time was taken for consideration of bids.

Attleboro, Mass.—Following recommendations have been voted by council. \$41,000 for general street expenses (including street railway and excise tax); \$3,500 for sidewalks and curbing; \$10,000 for dust layer and tar (including water tax); \$19,000 for lighting.

Boston, Mass.—Plans have been prepared for improvement of Strandway, South Boston, at cost of \$575,000, and this is one of first loan projects that Mayor Curley will submit to city council when annual appropriation bill is out of the way. Plans contemplate the reclamation of 75 acres of land, third of it covered by water at high tide; creation of plot of 56 acres for playground purposes; creation of new roadway to connect with Columbia road and Old Colony Blvd. and readjustment of sewer outlets which, under long time conditions, have proved great nuisance.

Clinton, Mass.—Finance board has approved widening of Water St. and for this purpose recommended appropriation of \$6,250, of which amount \$3,251.91 is to be paid for land damages.

Haverhill, Mass.—Town will vote on appropriation of \$4,000 for improvement of Rockingham Rd.

Merrimac, Mass.—Town will vote shortly on appropriation of \$4,000 for improvement of School and Broad Sts.

Milford, Mass.—Vote will be taken Mar. 6 on following appropriations: To see if town will vote to raise and appropriate sum of \$3,000 for purpose of re-building Congress St., beginning at junction of Fountain St., and extending in a northerly direction; to see if town will vote to raise and appropriate sum of \$4,000 for purpose of re-building West St., from Congress St. to a point at or near Quinlan St.; to see if town will vote to raise and appropriate sum of \$4,000 to rebuild Purchase St. from Wales St. south; to see if town will vote to raise and appropriate sum of \$3,200 for purpose of purchasing a road roller.

Springfield, Mass.—See "Sewerage."

Williamstown, Mass.—State and town will improve road from here to Vermont state line at expenditure of \$2,000.

Cassopolis, Mich.—At regular election April 3 citizens will vote on bond issue of \$200,000 for construction and maintenance of highways.

Saginaw, Mich.—Steps are being taken for improvement of road from Saginaw, along Sheridan Ave. Rd. and through Montrose, Flushing, New Lothrop and Chesaning and readily accessible to Burt & Fosters. This would mean 10 miles of stone road building and petitions are already being circulated among farmers living along proposed highway.

Duluth, Minn.—Petitions are being circulated for paving on Superior St. to Lester Park.

Duluth, Minn.—Property owners of 49th Ave. held short business session recently, at which it was decided to start circulating petition for paving and parking thoroughfare. Consensus of opinion was that petitions should call for improvements from Main to Highland St. Concrete paving 18 ft. on each side of street, leaving strip 42 ft. wide in the middle, to be parked under supervision of city park commissioner, is what the owners want. Petition will ask for this class of improvement.

Duluth, Minn.—Ordinances appropriating \$30,420 for sprinkling and oiling Duluth streets during coming summer have been passed by city commissioners. Measures introduced by Commissioner Farrell, were passed after being given their third reading. They provide for an appropriation of \$20,000 for street sprinkling and \$10,420 for road oil.

Duluth, Minn.—City will pave Grand Ave. to width of 42 ft.

Duluth, Minn.—Plans are being discussed for construction of 119 cement sidewalks and crossings during 1916.

Minneapolis, Minn.—Three and one-half miles of paving at cost of \$58,101, was Third Ward's share of paving ordered. Entire order will cost \$261,741.

St. Paul, Minn.—City council Feb. 29 passed orders for paving Prior Ave. from University Ave. to a point 165 ft. north of Chelton St., and Canada St. from Ninth to 14th St. Prior Ave., though it was declared that traffic on it is very heavy, will be paved with creosote blocks instead of granite blocks, curbing to be of concrete. Estimated cost is \$24,926.64, or \$5.92 a ft.

Tracy, Minn.—Yellowstone national highway will be graveled shortly, and will then complete stretch of 140 miles of continuous graveled road reaching from Mankato through Tracy west to state line.

Carthage, Mo.—Plans, specifications and estimates for paving Main St. from Fifth St. to Centennial Ave. with asphalt macadam were ordered prepared Feb. 29 by the city engineer, to be ready for next council meeting.

Chillicothe, Mo.—Petition, signed by a majority of property owners on West Calhoun St. from Sunset Ave. to Grandview Ave., was presented to the city council Feb. 28, asking for continuation of paving of West Calhoun St. to Grandview Ave., extreme western city limits. City engineer was instructed to prepare plans and specifications for improvement. Contract for paving Calhoun St. from Dickenson St. to Sunset Ave. has been awarded to John F. Meek and petition presented for same specifications as paving for which contract has been awarded.

Joplin, Mo.—Council has passed resolution ordering improvement of Main St. from 1st to F St. by curbing and guttering.

St. Joseph, Mo.—Ordinance providing for grading on 3d St. from Valley to Oberlin Sts. has been approved by council.

St. Joseph, Mo.—Ordinance has been approved providing for grading on 3d St.

St. Louis, Mo.—Following decisive vote for \$3,000,000 bond issue for good roads in St. Louis county, bond issues for same purpose are being advocated in St. Charles county and Jefferson county, which adjoin St. Louis county on north and south. Movement for a \$3,000,000 bond issue, equaling that of St. Louis county, has been begun in St. Charles county. In Jefferson county, petitions are being circulated asking county court to order a special election on half million dollar bond issue.

Camden, N. J.—Petition for boulevard on Federal St. has been presented to council and has been referred to street committee.

Elizabeth, N. J.—Bidding in Court St. foundation work was based on 3,320 sq. yds. of concrete and it included removal of old material which is said to be unfit for further use. Bids were as follows: John E. Donovan, \$1,085 per yd., total \$3,602.20; James J. Potts, \$1.21 per yd., total \$4,073.20, and the Union Paving Co., \$1.12 per yd., total \$3,718.40.

Elizabeth, N. J.—At a conference with representatives from Public Service Railway Co., board of work received official notice that traction company would agree to co-operate in Elizabeth paving job, in so far as to pave between trolley tracks and 3 ft. on either side, as was done in Broad St. Company also agrees to share expense of putting in new granite blocks between tracks in Broad St., between Jersey and Grand Sts., although this section was only recently improved by trolley company, old blocks having been reset on 6-in. concrete foundation. Estimates that total cost of work will be more than \$400,000.

Morristown, N. J.—Road oil for streets will cost town almost twice as much for coming season as last year. Bids for oil and stone were received Mar. 2 by street committee of board of aldermen. There were five bids for non-asphaltic road oil, prices ranging from 6.85 cts. per gallon to 9 cts. for an emulsion. Last year lowest bid was 3.99 cts. per gallon.

Montague, N. J.—Movement is on foot for construction of improved macadam road. Town committee have guaranteed 10 per cent of cost and will petition state and county aid.

New Brunswick, N. J.—Several delegations of taxpayers appeared Mar. 2 before board of freeholders and peti-

tioned for road improvements. Action was taken on only one request, that of improving Section 5 of Woodbridge Ave. road, Director A. J. Gebhardt advising other petitioners that several roads were to be improved this year and that their petitions would be taken under consideration.

Paterson, N. J.—County Engineer Thos. J. Wasser was instructed by board of freeholders, subject to approval of the state road commissioner, to go ahead with survey of Paterson plankroad, for a 33-ft. wide roadway along "Meadow" section, from Erie Railroad tracks at Homestead to North Bergen, stretch of more than a mile.

Perth Amboy, N. J.—Bids were received by Middlesex County board of freeholders Feb. 28 for delivery of stone in three sizes in 100-ton lots for 31 roads. Bids were submitted by F. R. Upton, of Newark; Commonwealth Quarry Co., of Springfield; Bound Brook Crushed Stone Co., and Delaware River Quarry and Construction Co. They were referred to road committee. Petition for macadamizing of road from Deep Cut Bridge, in South Amboy, to Miller's Corner, in Sayville, signed by 45 property owners, including representatives of the Union Powder Works and the Du Pont de Nemours Powder Co., was referred to the road committee. They ask for a 33-ft. road with 18 ft. of concrete and 2-ft. macadam shoulder. Freeholder A. T. Kerr introduced resolution which was adopted directing county engineer to prepare specifications for the work.

Roselle Park, N. J.—Westfield Ave. residents want that thoroughfare improved and petitions for paving north side of street are in circulation. Since Westfield Avenue is county road petitions are directed to board of freeholders.

Binghamton, N. Y.—County Treasurer Sherwood has received \$1,357 from the State department of highways for the supplemental highway apportionment for this county. The money will be expended under the direction of the county superintendent of highways.

Buffalo, N. Y.—Supervisors adopted a report by good roads committee authorizing building of 20 miles of good roads in county at cost of about \$140,000.

Freeport, L. I., N. Y.—Estimated budget for this village for ensuing year is computed to be \$58,000, and this includes two appropriations to be submitted to people. One for \$10,000 for police and other \$12,000 for street lighting. Eight propositions will be submitted to taxpayers. This number may be augmented before date of election. Propositions are, besides police and street lighting, \$1,500 for sidewalks, \$3,000 for water extension, \$4,000 for electric light extension, a proposition for a motor fire engine, another proposition for a new hose house for the Bay View Hose Company, and \$500 for maintenance of parks.

Hempstead, L. I., N. Y.—If approval of state highway commission can be obtained, work will shortly be started on state highway to run from Rosedale to Massapequa, touching most villages on south shore of Nassau County. It will cost about \$200,000.

Ogdensburg, N. Y.—State Highway Commission has sanctioned building of following highways in St. Lawrence County this summer: Ogdensburg-Canton, 1-3 mile; Depeyster-Ogdensburg, 12 miles; Fullerville-Edwards, 4 miles; Madrid Springs-Morley, 5 miles; Winthrop-Potsdam, 10 miles; Norfolk-Raymondsville, 3 1/2-10 miles.

Rochester, N. Y.—City Council will order improvement of Lowell St. by construction of pavement and curb at estimated cost of \$23,000.

Rochester, N. Y.—Council will order improvement of Virginia Ave. by construction of pavement. Estimated cost, \$20,000.

Rochester, N. Y.—Council will order improvement of Saxton St. by construction of pavement at estimated cost of \$5,200.

Yonkers, N. Y.—Supervisor Wendover of New Rochelle introduced resolution in board of supervisors Feb. 28 at White Plains calling for new county highway from Getty square, Yonkers, to New Rochelle. Resolution was referred to committee on good roads, which will investigate project and report back to board on advisability of plan.

Yonkers, N. Y.—City engineer has been instructed to prepare plans and specifications for elimination of grade crossings at Dunwoodie and Nepperhan stations.

Canton, O.—Stark county has been apportioned \$53,000 from fund of state highway department for completion of Canton-Akron road paving in this county and repairing of roads already paved throughout county.

Canton, O.—Stark county's first issue of bonds for road purposes this year will amount to \$135,000, and bonds will be sold on March 17 at court house, by County Commissioner Bidwell Feb. 8. Other bonds for road purposes to be sold later this spring probably will bring total for year up to nearly half a million dollars. Of first issue of \$135,000, commissioners are to sell \$10,000 in bonds to care for cost of paving the Cairo-Hartsville road of little more than 5 miles. This road will be paved with brick and last year when contractors bid on same contract lowest bids were in neighborhood of \$100,000. Commissioners believe, however, that county may have to pay more for work than if contract had been let last year because of increased cost of material and labor. Remaining \$25,000 will be used to pay cost of improving Alliance-Lexington road, running north of Alliance for about two miles. Bonds will be in the denomination of \$500 each and will bear five per cent interest. The bonds will all be paid in 10 years.

Cincinnati, O.—There will be introduced in Council at its next meeting ordinance authorizing \$2,250,000 bonds for street improvement purposes to be submitted to vote at primaries in April. In accordance with request from Council, City Engineer Krug Feb. 29 submitted to that body estimate and list of streets which it is proposed to improve. It is as follows: Fairbanks Ave., \$151,500; Ludlow Ave., \$142,500; Quebec road, \$175,000; Eastern Ave., \$459,350; Madison road, \$142,500; Public Landing, \$180,000; Hamilton Ave., \$251,250; Grandin road, \$50,000; Central Ave., \$120,800; Harrison Ave., \$39,750; Freeman Ave., \$105,000; total, \$1,818,050. To this will be added bond issue of \$400,000 for high-pressure service water mains and still another of \$300,000 for the purchase of the Zoo.

Columbus, O.—State Highway Commissioner Cowen said Feb. 25 that Butler county would get this year for use on main market roads \$12,500.

Columbus, O.—Sealed proposals will be received at office of board of county commissioners of Franklin county, Columbus, until 10 a. m., Mar. 18, for purchase of following Franklin county road improvement bonds, to wit: Harbor road improvement, 390 bonds of \$500 each, dated March 1, 1916, bearing interest at rate of 4½ per cent. per annum, interest payable semi-annually on first day of March and September of each year. Bonds due and payable as follows: \$20,000 on first day of March of the years 1917 to 1925, both inclusive; \$15,000 on first day of March, 1926. Lane road improvement, 26 bonds of \$500 each, dated March 1, 1916, bearing interest at rate of 4½ per cent. per annum, interest payable semi-annually on first day of March and September of each year. Bonds due and payable as follows: \$1,000 on the first day of March of years 1917 to 1920, both inclusive; \$1,500 on the first day of March of the years 1921 to 1926, both inclusive.

Hamilton, O.—Commissioner Hamann recommends construction of macadam roads, to cost \$4,500 per mile.

Lima, O.—It is probable that amount of bond issue to be submitted in April will be \$75,000. This is to cover both city's proportion of paving on 50 streets and of cost of sewers which must be installed in certain streets before pavements can be laid without danger of having later to be torn up.

Mansfield, O.—Richland county plans to spend \$100,000 for road construction and improvement this spring.

Middletown, O.—Cement sidewalks, curbs and gutters will be established on all streets in Middletown not already thus improved, according to decision reached by city commission at its meeting Feb. 25. Petition was received from residents of Lind St., which runs between Centennial and Michigan Aves., asking for this improvement. Matter was referred to the street committee and then question was asked as to how many streets remained thus unimproved. It was learned that but 10 or 12 are total number, and accordingly street committee was authorized to determine just which streets these are and to report at next meeting, when steps will be taken to have all improvements taken care of in lump.

Middletown, O.—Temporary repairs will be made at once on brick market

road between Middletown and Engleaside as result of visit of state highway engineers to this city Feb. 26.

Massillon, O.—Resolution by streets and alleys committee directing director of public service to gravel and repair West Cherry St., Lake St., between Mill and West Sts., and Wetmore St. between Erie and Lincoln Ave., and to order property towners to construct suitable ash walks on streets where the sidewalks were in bad condition was adopted by council at meeting Feb. 29.

Massillon, O.—Following action Feb. 26 of trustees of Perry and Tuscarawas townships in passing resolutions favorable to pavement of mile of Pigeon Run road south from West Tremont St., delegation of residents of road together with members of boards of trustees of both townships, Massillon Automobile Club and Massillon Chamber of Commerce will hold conference with county commissioners in an effort to induce them to take action authorizing pavement of this stretch of road this summer.

Portage, O.—Farmers of Portage Twp. have practically decided to rebuild Old State Rd., making it concrete pavement 16 ft. wide, and about 4½ miles long. Project has now progressed so far that it is expected work will be started this spring and entire road built during 1916.

Springfield, O.—City Auditor W. J. Barrett will receive bids until noon on Monday, April 3, for purchase of bond issue in sum of \$15,391 for street improvement.

Tiffin, O.—Paving improvement of Douglas St. as petitioned was favored by street committee. Proposal was referred to engineer to make survey and estimate.

Ringling, Okla.—Campaign is being initiated here looking to voting of \$50,000 in bonds for constructing permanent highways in Earl Twp., in which town of Ringling is situated.

Providence, R. I.—Senate Mar. 1 passed act appropriating \$50,000 for reconstruction of state highway in town of South Kingstown and authorizing said town to issue bonds for like purpose. Senate also passed resolution providing appropriation of \$10,000 for construction of certain highway in towns of Tiverton and Little Compton. State is to furnish the labor and citizen has offered to donate land and material for work.

Pendleton, Ore.—Umatilla county will vote on question of bonding county for \$980,000 for road improvements at the spring election. This decision was reached by executive committee of Umatilla County Good Roads and Pendleton Commercial associations and meeting will be held shortly with county court to work out details. Plan is to make bonds 5 per cent, 15-year serial bonds. Funds will provide for road improvements in every section of county and hard surfacing some of principal highways.

Portland, Ore.—Commissioners of Snohomish county, Washington, together with highway advisory board composed of citizens of that county, have arrived in Portland to study paving situation in Multnomah county and gather ideas before expending \$1,800,000 which was recently voted for highway construction and improvement in their county. Plan adopted by the Washington officials calls for construction of 140 miles of paving before the end of 3 years. About 44 miles will be constructed within present year. One of plans proposed is paving of Pacific highway through Skamania county, from King to Skagit county.

Erie, Pa.—J. & M. Doyle Contracting Co. were low bidders for paving of Raspberry St. from Fourth to Eighth Sts. In view of fact that asphalt has been rising rapidly during past few months, bid of the Doyle Co. is considered low by engineering department. Total amount of the bid is \$10,270. The Mayer Bros. Construction Co. bid \$11,162 and the John McCormick & Sons Co. \$10,289. Resolution awarding contract to the J. & M. Doyle Co. will be introduced in council.

Harrisburg, Pa.—Council contemplates calling election to vote on bond issue of \$80,000, of which it is estimated \$25,000 would be needed for motor apparatus and remaining \$55,000 would be used in street improvement.

Harrisburg, Pa.—State highway department has opened bids for 100 road machines, to be used in different parts of state during coming year. Seven companies submitted estimates. After reading them, Commissioner Cunningham or-

dered them checked and announced that contract would be awarded shortly.

Tionesta, Pa.—Movement is on foot to connect this town with Oil City on water level road on east bank of Allegheny river. Chairman Randall has been empowered to appoint committee of practical men to go over the route from Tionesta to Venango county line and gather data on which to base an estimate of cost of construction. He was also authorized to appoint finance committee. These committees have been named as follows: Viewers—F. F. Whittekin, Frank Nelson and J. A. Adams; finance—J. B. Muse, J. G. Jamieson and C. A. Larson.

Wilkes-Barre, Pa.—Ordinance authorizing grading, curbing and paving of Brook St., between Regent and Barney Sts., with sheet asphalt; Pearl St., between Kidder and Scott Sts., with sheet asphalt, and Washington St., between Butler and Elm Sts., with sheet asphalt, brick and Belgian block, has been presented and will come up for final passage at council meeting March 14th.

Newport, R. I.—Resolution has been passed authorizing issuance of \$25,000 in serial bonds for Washington St. extension.

Bristol, Tenn.—City commission at its weekly meeting Feb. 29 passed on its first reading ordinance providing for improvement District No. 2, which includes number of principal streets of Fairmount. This ordinance will be presented for passage on second reading, ten days after publication. It is hoped therefore to have it in effect about 15th of March.

Knoxville, Tenn.—Announcement that Kingston Pike had been chosen as one of the "state highways" in Knox County was made Feb. 24 by John L. Callaway, clerk of Knox County road commission.

Ballinger, Tex.—Runnels county commissioners' court has ordered special road tax election for entire county, to be held in the next 40 days. Date for election will be set by county judge. Fifteen thousand dollars will be raised by this tax, additional to 15c. tax already levied. Petition asking for concrete causeway across the Colorado river at foot of 8th St. was refused by commissioners.

Belton, Tex.—Bond issue for \$8,000, held in road district No. 18 of this county Feb. 22, carried by a vote of 17 to 6. Roads to be improved will be some 4 or 5 miles in Wilkinson Valley neighborhood.

Cumby, Tex.—At mass meeting held at Cumby movement was started for a bond issue to build good roads in this section to connect with Jefferson Highway, official route for which has been designated through this place. In addition to interest in connecting line, there is movement to build macadam roads both north and south out of Cumby.

Pittsburg, Tex.—Commissioners' Court, acting upon petition of voters of county, has ordered election for issue of \$10,000 good roads bonds for Precinct No. 1 of Camp County, election to be held March 16.

Wilkinson Valley, Tex.—Vote held in Wilkinson Valley precinct Feb. 22 went favorably to good roads by a vote of 17 to 6. Bond issue will be for \$8,000, and some 4½ or 5 miles of highway will be improved. Precinct includes the Newt, Bigham, Sparks, F. K. Austin and other farms.

Logan, Utah.—Movement is on foot for paving on Main St. from First South St. to Logan river bridge, distance of five blocks. City commissioners will apply for state aid.

Lewisburg, W. Va.—Petitions are being circulated in Lewisburg and White Sulphur districts of county asking the court to submit to a vote proposition to bond district for \$160,000 for good roads. Williamsburg and Falling Springs districts are also seeking an election on same project.

Pomeroy, Wash.—Garfield county plans construction in 1916 of ten miles of graded road at a cost of \$30,000 and four miles of gravel road at a cost of \$9,200, one concrete bridge with 60-ft. span, four wood bridges with 30-ft. spans and one steel bridge with 60-ft. span. Total cost \$8,000.

Seattle, Wash.—Roads and surveys, etc., to be made in Stevens County from State highways funds appropriated, are Inland Empire highway, 43 miles, and Davenport-Meyers Falls highway, 35 miles. County will survey 15 miles of permanent highways. Eight miles of permanent highways will be graded at approximate cost of \$17,600 and surfaced at cost of \$14,400. Probable construction of county and state road bridges for 1916 will amount to \$10,000, kinds of structures required not yet being de-

cided on. Surveys of county roads based on last three years' work, will approximate 150 miles. Amount to be spent from district road and bridge funds in county road construction will amount to \$5,500 and maintenance \$34,000. Amount to be spent from county road and bridge fund will approximate \$7,000 for construction and \$2,000 for maintenance. R. B. Thomas is county engineer and is located at Colville.

Seattle, Wash.—Board of public works opened bids Feb. 25 for Orchard St. grading and for Fairmount Ave., et al sewers. J. B. Romano, 602 32d Ave., at \$24,639, was low bidder on the Orchard St. job, and the City Contracting Co., 1319 21st Ave. South, at \$49,768, was low on the other. Both contracts will probably be awarded next week. Following is list of bidders on both jobs: Orchard St. grading: J. B. Romano, 602 32d Ave., \$24,639; Henry Brice, 4234 Densmore Ave., \$26,642; B. H. Petley, 1419 37th Ave., \$27,872; Russell & Gallagher, Railway Exch. Bldg., \$28,295; Burnett Const. Co., 909 2d Ave., \$28,723; D. & V. Bressi, 1101 25th Ave. South, \$38,031. Fairmount Ave. sewers: City Cont. Co., 1319 21st Ave. South, \$49,768; Cristofaro & Raimondo, 1511 16th Ave. South, \$52,253; J. B. Romano, 602 32d Ave., \$53,203; H. Dahlstrom, 2437 W. 56th St., \$54,652; N. Fiorito & Bros., 1630 25th Ave., \$55,519; V. Ramaglia, Yesler Station, \$61,840.

Spokane, Wash.—County commissioners Feb. 25 passed resolution initiating extension of Inland Empire permanent highway No. 13-B from Deer Park to Stevens county line. This is distance of 3.86 miles and cost will be in neighborhood of \$10,000 a mile, according to members of board.

Janesville, Wis.—Board of works has agreed on following paving program for this year: South Franklin, from Milwaukee to Galena St., to be of brick on macadam foundation; Oakland Ave. to be of concrete or asphaltic concrete, and some form of oiled macadam on three blocks of Mineral Point Ave.

CONTRACTS AWARDED.

Douglas, Ariz.—To Warren Bros. Co., Phoenix, Ariz., at \$99,836.01, for paving in this city. Other bidders were as follows: California-Arizona Co., \$101,116.99; Toohy & Sons, \$103,501.32.

Georgetown, Ill.—To Foulkes Constructing Co., Terre Haute Ind., for 5½ miles of concrete pavement at following bid: Township, \$52,925, and city, \$12,340. N. T. Haworth is city clerk.

Logansport, Ind.—Following contracts have been awarded in Miami County for gravel roads: To Hyman & Brandt, Logansport, Ind., at \$7,041; to John L. Miller, Miami, Ind., at \$8,591; to Null & Co., Windfall, Ind., at \$6,269; to J. Frank Hunt Amboy, Ind., at \$5,380.

Peru, Ind.—County commissioners were in session Feb. 28, at which time contracts were awarded for construction of four roads in Miami county as follows: J. Frank Hunt, of Converse, Shinn road in Harrison township, \$5,380; Null & Co., of Windfall, Bradley road in Butler township, \$6,269; Hyman & Brandt, of Logansport, Lamm road in Jackson township, \$7,041; John L. Miller, of Miami, Kelm road in Perry township, \$8,591.

Davenport, Ia.—To T. J. McCarthy, local, for 15,414 sq. yds. brick pavement on 5-in. concrete base, 5,000 cu. yds. old brick and macadam excavation at \$1.84 per sq. yd. for paving, 50c. per cu. yd. excavation; total, \$30,651.77. Allen R. Boudinot is city engineer.

Mason City, Ia.—For 152,000 sq. yds. of sheet asphalt, with 5-in. concrete foundation, to Bryant Asphalt Paving Co., Waterloo, Ia.

Lyons, Kan.—To Watts & Amerman, Salina, Kan., for 11,000 sq. yds. brick pavement, with 4-in. cement foundation, at \$1.78 for paving, 43c. per sq. yd. for excavation.

McPherson, Kan.—City commission of Council Grove, Kan., have awarded paving contract to E. A. Ballweg & Co., Emporia, Kan. Work will be of brick and will total about \$43,000. H. A. Rowland is Con. Engr., McPherson, Kan.

Louisville, Ky.—Subject to the approval of the general council and Mayor Buschemeyer, board of public works has awarded contracts for reconstructing streets amounting to approximately \$50,000. The streets to be reconstructed, the contractors receiving the contracts and the amounts of the contracts are as follows: With asphalt—Bardstown, Slaughter to Cherokee, Bickel Asphalt Paving Co., \$13,578; Walnut, 8th to 9th, Bickel Asphalt Paving Co., \$4,012; Broad-

way, Cecil to 44th, Louisville Asphalt Co., \$10,353; 2d, Broadway to Jacob, Louisville Asphalt Co., \$2,353; Guthrie, 2d to 3d, Louisville Asphalt Co., \$3,371. With vitrified block—Green, Floyd to Preston, G. W. Gosnell Co., \$4,076; 9th, Green to Jefferson, F. G. Breslin, \$2,444; 28th, Broadway to Garland, L. R. Figg Co., \$12,188.

Louisville, Ky.—Additional contracts for street construction have been awarded by board of public works. For improving with asphalt at cost of property owners board awarded to Bickel Asphalt Paving Co., Deerwood Ave. from Schwartz to Morris Aves. at \$5,977, and Hill St. from 18th to 25th Sts. at \$1,906, and to Louisville Asphalt Co. Stoll from Frankfort St. to the L. & N., at \$7,135, and Brandeis St. from Preston St. to Flat Lick road, at \$9,560. Hoke Construction Co. was given contract for paving with vitrified brick State St., from Prospect St. to L. & N. tracks, at \$4,703.

Portland, Me.—Contract for short section, distance of .64 of mile through town of Scarboro, has been awarded to Forgiogione & Romano, of this city, contract price being \$8,965.40. Construction is to be cement concrete, 16 ft. in width, of same type as new section built between Portland and Dunstan last year. Other bidders and their bids for the same stretch were as follows: John H. Kerr, Rumford, Me., \$10,527.24; Hassam Paving Co., Worcester, Mass., \$11,256.20; A. Williams Co., Boston, Mass., \$15,712. The award for the remaining distance between Scarboro and Saco will be made within a day or two. Contract for clearing the right of way on new state highway between Jackman and Rockwood, a distance of 31 miles, was awarded to Murray Bros., Bangor, for \$16,116. The contract requires 162 acres of clearing and 50 acres of grubbing and covers the entire right of way between two points.

Scarboro, Me.—Contract to build about 3½ miles of concrete highway between Biddeford and Scarboro, Me., has been awarded to David J. Sheehan Co., of Lynn, Mass. Bid was \$51,000. Mr. Sheehan being given preference over a bid \$3,000 under this figure made by Maine builder. Mr. Sheehan has signed contract to have road completed and open to traffic by July 1, 1916.

Duluth, Minn.—County Auditor Halden Feb. 25 awarded contract for construction of County Ditch No. 4, drainage project in Albion District, to E. W. Coons Co., of Hibbing, on its bid of \$102,517.86. Contract calls for excavation of 651,000 cu. yds. of earth and rock and grading of 68 or 70 miles of roadways on waste banks of ditches.

Omaha, Neb.—City council has awarded to Charles E. Fanning contract to pave Center St., 36th to 54th Sts., with vitrified brick block at \$2.18 per sq. yd., as per bid received Nov. 23, 1915.

North Arlington, N. J.—North Arlington borough council at special meeting Feb. 28 awarded contract for 500 tons of stone for roads to Wurdeman & Co., Inc., of Lyndhurst, whose bid was \$1.83 per ton.

Elmira, N. Y.—For brick pavement with 5-in. concrete foundation to Bison City Engineering & Contracting Co., Buffalo, N. Y., at \$9,569.30. Other bidder was Holleran Bros., W. Water St., Elmira, N. Y., at \$24,255.53.

Cincinnati, O.—To Kirchner Construction Co., Cincinnati, for macadam pavement at \$1.576. C. A. Zech, assistant secretary.

Jamestown, Tenn.—For 175,375 cu. yds. earth excavation, 19,375 cu. yds. solid rock excavation, 33½ miles grading and drainage to Solomon Constructing & Engineering Co., Harriman, Tenn., at \$53,995.85. W. I. Smith, Engr., Fentress County Highway Comm.

Knoxville, Tenn.—To Murray Construction Co., for paving of State St., between Church and Vine Sts., at \$16,017.56. Other bidders were as follows: Bickel Asphalt & Paving Co., \$16,762.80; West Construction Co., \$16,759.12; Gulf Paving Co., \$16,629.64.

Corsicana, Tex.—Contracts were awarded as follows: For paving of W. 4th Ave. with 2½-in vertical fiber brick on 4-in. foundation, to the Standard Paving Co., at \$1.81 per sq. yd. For paving of West Collin St. with asphaltic concrete, on a 4-in. base, to Lester Levy, at \$1.25 per sq. yd. For paving of 18th St., from the south line of 4th Ave. to the north line of 7th Ave., with vibrolithic pavement Class "B", to the Vibrolithic Construction Co., at \$1.70 per sq. yd. For paving S. 18th St., from south

line of 7th Ave. to north line of 13th Ave., with asphaltic concrete on a 4-in. base, to Lester Levy, at \$1.25 per sq. yd. For paving N. and S. 15th St. from north line of 7th Ave. to south line of W. 2d Ave., with Vibrolithic Class "B" material, to Vibrolithic Construction Co., at \$1.70 per sq. yd. For paving of N. 15th St. from north line of W. 2d Ave. to cemetery, with asphalt macadam, using gravel, to Worthington & Lawrence, at 80 cts. per sq. yd. For paving of 30th St. with asphaltic concrete, on 4-in. base, to Lester Levy, at \$1.25 per sq. yd. Contract on all above streets includes construction of concrete gutters 18 ins. wide and curbs 6-ins. high.

Dallas, Tex.—City commissioners Feb. 23 awarded contract for paving Tremont St. between Henderson and Fulton, to Vibrolithic Co. on bid of \$13,393.37. Property owners will pay \$12,439.62, and street car company \$953.73 of this amount. City bears no part of expense.

Olympia, Wash.—State highway commission awarded contract for the Sunset highway in Kittitas county to Martin Holm, Ellensburg, for \$22,090.25. Contract calls for approximately 14,000 cu. yds. of common excavation, 10,500 cu. yds. of loose rock excavation, 14,000 cu. yds. of solid rock excavation and 12,000 cu. yds. of overhaul.

SEWERAGE

Los Angeles, Cal.—Ordinance has been adopted for construction of sanitary sewer in sewer right of way north of Gainsborough Ave., between Commonwealth Ave. and Cromwell Ave.

Sacramento, Cal.—City commission will improve Hollyhook Ave. by construction of sewers.

Hartford, Conn.—Following bids were opened Feb. 23 for vitrified sewer tile for Glendale Ave. sewer: W. T. Ryan Const. Co., 520 ft. 10-in. sewer at \$1, 4 M. H. at \$45; 21 H. C. at \$8; 2 Y. S. at \$2; 15 days at \$5; total \$947. M. C. Casciano & Co., at \$1.12, \$40, \$8, \$2, 13 days at \$5, respectively, total \$979.40. A. D. Ambrosio, at \$1.30, \$4, \$7.50, \$1, 10 days, respectively, total \$1,045.50. P. Bonadies Co., at \$1.33, \$50, \$7.50, \$1.50, 20 days, respectively, total \$1,152.10. O'Neill Bros., at \$1.60, \$50, \$10, \$2, 20 days respectively, total \$1,346. Louis Petrossi, at \$2, \$50, \$12.50, \$2, 35 days respectively, total \$1,681.50. R. N. Clark is city engineer.

Boulder, Colo.—See "Water Supply." **Alton, Ill.**—Official estimate of cost of East End sewer which will be made shortly will show cost of that improvement to be over \$100,000. This will run cost of city improvement work to be done in city of Alton this year by city to over \$300,000.

Quincy, Ill.—Sewer connection for city reservoir and means of cleaning and flushing it, without flooding adjacent property, was provided for Feb. 26 in resolution adopted by board of local improvements. This resolution recommended construction of sewer on Cedar St., between 28th, to connect directly with reservoir.

Fort Madison, Ia.—Erection of pumping station near west end of city to take care of sewage of Fort Madison, operation and maintenance of that institution and that power company pay all differences in cost, in lengthening of lines of sewer to connect with main trunk line to the plant, were demands put before officials of Mississippi River Power Co. in meeting with members of city council Feb. 29.

Lexington, Ky.—Ordinance has been passed ordering construction of sanitary sewer on North Limestone St. from Third St. to Main St.

Clinton, Mass.—Town will vote on appropriation of \$3,500 and \$1,000 for extension of sewers on Wilson and Goss Sts., respectively.

Springfield, Mass.—Total of expenditures for coming municipal year which will be recommended by town finance committee at annual town meeting will be \$167,950. The more important items of new work and improvement recommended are following: Reimbursement for Lincoln Park sewer, \$28; reimbursement for laying sewer and water pipes on Admiral St., \$439; reimbursement for laying water pipe on South St., \$40; repairs to school buildings, \$2,500; gravel road on Lovefield St., \$500; gravel on Williston Ave., \$552; repairs on Cottage St., \$400; hydrant on Mt. Tom Ave., \$581; water pipe on South St., \$127; reimbursement of district No. 2 for water meters, \$900; installation of water meters in district No. 3, \$500; drain between Knipfer

Ave. and Maple St., \$1,200; surface sewer on Lovefield St., \$160; water main on Northampton St., \$300; water pipe on Pleasant St., \$1,475; cinder walk on Parsons St., \$100; sewer on Everett St., \$1,250.

St. Paul, Minn.—E. T. Webster was low bidder on several public improvements contracts for which proposals were opened Feb. 28 by city contracting committee. His figure, \$2,682.06, on construction of sewer on Princeton Ave. from Cleveland Ave. to Sue St., is \$800 under city engineer's estimate. He bid \$1,936.45 on construction of a sewer on Prior Ave. from Pennock St. to Hilles Ave. The engineer's estimate was \$2,132. Mr. Webster bid \$1,077.50 as against engineer's estimate of \$1,277 on construction of a sewer on Central Ave. from Dunlap St. to Lexington Ave. DeGraff & Wolf bid \$8,545 on construction of sewer on Chatsworth St. from Otto Ave. to Race St., and on Race St. from Chatsworth St. to Alaska St. Engineer's estimate was \$10,153. Chris Johnson's bid of \$469.49 was low on construction of sewer on Agate St. from Cayuga St. to a point 40 ft. north of Granite St. Engineer's estimate was \$566.

Billings, Mont.—Plans for proposed belt storm sewer, now in hands of city engineer, are nearing completion and sewer will extend from North 15th St. to Third St. west on Second and Third Aves. north and Clark Ave.

Camden, N. J.—Commissioners will construct sewer in 36th St.

Plainfield, N. J.—Special election will be called shortly to vote on bond issue of \$20,000 to provide funds to complete sewer job.

Camden, N. Y.—The subject of sewerage for this village has been under discussion for some time, and different propositions to this end, are to be placed before property owners for their vote at next charter election, to be held in March.

Rochester, N. Y.—Council will order improvement of McKinley St. by construction of sewers at estimated cost of \$3,800.

Wilmington, N. C.—Councilman McCraig submitted letter from W. E. Merritt, superintendent of water and sewerage department, suggesting purchase of duplicate of present new pump at the sewerage disposal station in eastern part of city, at cost of \$1,188. Letter was referred to committee for investigation and further report.

Akron, O.—With city's \$446,000 sewage plant still unfinished, Service Director Beck has started going over plans for auxiliary plant west of divide on West Hill. Sewage can't be carried over high point, he said, and state board of health has ordered that steps be taken within two years to remedy present unsanitary conditions there. R. Winthrop Pratt, Cleveland engineer, who is building main plant, has presented three sets of plans to Beck for auxiliary plant. It will cost around \$150,000.

Coshocton, O.—Council reached an agreement with Messrs. Hall and Henderson Feb. 28 concerning storm sewer from city limits at 18th St. to 15th St. on East Chestnut. Sewer will be built of 5 ft. tile, and the Messrs. Hall & Henderson, owners of lots abutting on south side of the street agree to pay one-half cost of sewer, city to pay the other half.

Lima, O.—See "Streets and Roads."

Springfield, O.—City will sell bond issue of \$349,700, for purpose of providing funds to pay for city's portion of cost of street improvement and construction of sewers.

Eric, Pa.—Request of city for permission to run sewer through property of Soldiers' and Sailors' Home, at 3d and Ash Sts., will be considered at meeting of Soldiers' and Sailors' Home commission in Philadelphia shortly.

Harrisburg, Pa.—Following permits and decrees were issued by Pennsylvania department of health relative to sewerage during period from Feb. 1st to 29th, 1916: Doylestown township, Bucks county (National Farm School)—sewerage treatment, 10; Potter township, Beaver county (overseers of the poor)—sewerage treatment, 10; Jersey Shore—approving plans for sanitary sewer system and pumping station, 15; Lebanon—approving plans for additions to sewerage treatment works, 15; Mt. Pleasant—approving plans for sewer extensions, 15; Philadelphia—approving plans for sewer extensions, 15 and 16; Scranton (Hospital for Contagious Diseases)—approving plans for treatment works, 15; East Conemaugh—requiring comprehensive sanitary sewer plans, 29; Oakhurst—requiring comprehensive sanitary sewer plans, 29; Lewis-

town—approving plans for sewage treatment, 29.

Providence, R. I.—Board of contract and supply opened bids Feb. 28 at city hall for construction of sewers in following highways: McDonough, Ardoene, Charles, Hawkins, Lester, Piedmont, and Manning Sts. and Channing, Hilltop and Hillhurst Aves. Contracts will be awarded shortly. Bidders were as follows: William B. Shaw, Valley Co., Antonio Gannelli, Antonio Aiello, Nelson W. Colgrove, M. A. Gammino Const. Co. and Charles Crankshaw.

Rogersville, Tenn.—Movement is on foot for construction of system of water works and sewer in town, either by private capital or by voting of bonds by town. Committee of representative citizens was appointed to take up proposition of water works and sewer and investigate matter thoroughly and make report to meeting to be hereafter called as early as practicable. Committee on sewerage and water works is composed of following citizens of Rogersville: W. D. Harmon, chairman; C. W. Margrave, F. J. Testerman, T. J. Price and W. D. Kenner.

Anson, Tex.—Henry E. Elrod, Dallas, Tex., has been retained as consulting engineer to design and supervise installation of sewage disposal plant for Jones county sewer system.

Austin, Tex.—Attorney General's Department has approved sewage bond issue of \$22,500 of city of Gatesville, 40-10s, 5 per cent.

Dallas, Tex.—Dallas voters at general city election April 4 will pass on two bond issues and proposition to increase city's bond limit from \$8,000,000 to \$9,000,000. One bond issue of \$250,000 is proposed to purchase block of ground in front of new Union Station and beautify it. The other is for \$300,000 for construction of storm sewers and culverts. If the two issues are voted, with increase which is proposed in bond limit, there still will be margin of \$900,000 if city desires to construct and operate an electric light plant of its own and to vote bonds for that purpose.

Stamford, Tex.—Engineer Henry E. Elrod has been retained as consulting engineer to prepare plans and supervise installation of disposal plant for Stamford Sewer Co., of this city.

Suffolk, Va.—See "Miscellaneous."

Seattle, Wash.—See "Streets & Roads."

Milwaukee, Wis.—Common council Feb. 29, unanimously passed resolutions submitting to referendum vote of people in May proposal for \$750,000 bond issue for municipal street lighting system and \$1,560,000 bond issue for early completion of the new sewerage disposal system.

Milwaukee, Wis.—Special and regular meetings will be held by city council March 6 and action will be taken on a series of proposed bond issues as issues for voters to pass upon in the city election. Bond issues include \$1,560,000 to increase construction work of sewerage commission.

Racine, Wis.—Movement is on foot for system of overflow sewers as recommended by City Engineer P. H. Connolly. Estimated cost, \$5,375.

Randolph, Wis.—All bids received Feb. 28 for sewage disposal plant and sewer pipe have been rejected. J. O. Jones is city clerk.

CONTRACTS AWARDED.

Compton, Cal.—For septic tanks and filters for proposed sewage disposal plant to James Kennedy, Los Angeles, at \$5,400.

El Centro, Cal.—For joint sewage-disposal plant to James Kennedy Cons. Co. Olmstead & Gillette are Consulting Engrs.

Kendallville, Ind.—To McLaughlin Construction Co., Pittsburgh, Pa., for 4 miles of 8, 10, 12, 15 and 24-in. vitrified sewer pipe at \$26,219; house connections 50c. per foot. To Moreno Brooks Burkham, St. Louis, Mo., for sewer lift and force at \$3,370. Willis E. Sawyer is city engineer.

Strawberry Point, Ia.—To O. G. Kringle, Dubuque, Ia., for vitrified clay sewer pipe at following bid: 2,150 ft. 6-in. sewer at \$0.15; 15,438 ft. 8-in. sewer at \$0.17; 3,966 ft. 10-in. sewer at \$0.35; 35 M. H. at \$30; 1 D. M. H. at \$50; 13 F. T. at \$60; 360 S. pipes at \$25; 2,000 comp. at \$15; total, \$17,324.40. Other bidders were as follows: Cook & Kean, Dubuque, Ia., at \$5.70, \$0.40, \$50, \$80, \$30, 20, respectively, total \$18,374.90; Wm. Danforth, St. Paul, Minn., at \$6.72, \$75, \$36, \$50, \$70, \$20 and .08 respectively, total \$17,745.86; A. C. Hemstock, Cedar Rapids, Ia., at \$0.50, \$0.70, \$0.80,

\$35, \$40, \$70, \$30 and .10 respectively, total, \$17,537.40; R. C. De La Hunt, Cedar Rapids, at \$5.72, \$85, \$35, \$40, \$55, \$5 and .08 respectively, total \$17,583.86.

Salina, Kan.—For additions to sewer system, to Snuder & Ahart. Estimated cost, \$5,439. P. J. Wakenhut is city engineer.

Lexington, Ky.—Ordinance has been passed accepting bid of P. P. O'Neill & Bro. for construction of northern main sewer, from Limestone St. to Jackson St., and authorizing Mayor to enter into a contract for said work at following prices: 12-in. pipe, 40c. per lin. ft.; 10-in. pipe, 30c. per lin. ft.; 5-in. pipe, 15c. per lin. ft.; 12-in. by 5-in. Y's, \$1 each; 10-in. by 5-in. Y's, 80c. each; 5-in. 1/2-in. bends, 24c. each; 5-in. 1/2-in. bends, 24c. each; earth excavation, 54c. per cu. yd.; rock excavation, \$2.98 per cu. yd.; manholes, \$35 each; flushtanks, \$60 each; lumber left in place, \$28 per 1,000 ft. B.M.

Austin, Minn.—For sewer, to H. J. Cathro. Estimated cost, \$9,641.

Minneapolis, Minn.—For furnishing vitrified clay sewer pipe for season, to Streator Clay Mfg. Co., 3032 22d Ave. S. Minneapolis. T. W. Capplin is city engineer.

New York, N. Y.—For sewers in Sackett Ave. to Ammann & Sullivan, 24 East 198th St., at \$78,744.

Cincinnati, O.—To Thos. Maloney for sewer construction on Mignon Ave. and right of way, at \$1,882.60. C. A. Zech is assistant secretary.

Youngstown, O.—Following street contracts have been let by board of control: Park Court sewer and paving, M. F. Clark, \$2,619.40; Warren Ave. sewer, E. Cobricate, \$6,950.30; Oak Hill Ave. sewer, A. O'Horo, \$634.60; South Ave. sewer, Dell & Serafino, \$5,840.17; Market St. sewer, Dell & Serafino, \$10,480.38; Price Ave. grading, Charles Harris, \$1,344.25.

Canadian, Tex.—For sewer system to Municipal Engineering & Construction Co., Oklahoma, Okla. Estimated cost, \$25,000. Oswell Hudson is Mayor.

Dallas, Tex.—For sewers in Magnolia, Caruth and Hord St. to Winslett-Eldridge Co., at \$4,837. R. C. Cason is Sewer Comm.

Houston, Tex.—For sewer in Noble St. to T. A. Garvin, Houston, to cost approximately \$5,000. E. E. Sands is City Engr.

WATER SUPPLY

Los Angeles, Cal.—Following bids have been received for water pipe for San Fernando valley irrigation district: Baker Iron Works: Item No. 1, 1,323 tons, \$146,728; item No. 2, 899 tons, \$203,265; item No. 3, 791 tons, \$90,489; item No. 4, 2,900 tons, \$319,865; total bid, 5,918 tons, \$660,347. Lacy Mfg. Co., item No. 1, 1,324 tons, \$142,687; item No. 2, 891 tons, \$97,119; item No. 3, 773 tons, \$84,257; item No. 4, 2,910 tons, \$322,734; total bid, 5,898 tons, \$646,798. Western Pipe & Steel Co., item No. 3, 784 tons, \$89,925; item No. 4, 2,898 tons, \$319,198; total bid, 3,682 tons, \$409,123. Llewellyn Iron Wks., item No. 1, 1,335 tons, \$140,175; item No. 2, 886 tons, \$100,120; total bid, 2,221 tons, \$240,295. Los Angeles Mfg. Co. item No. 4, 2,725 tons, \$251,375.

San Diego, Cal.—The council is expected to pass an ordinance designating March 31 as the date for the special bond election to vote on following propositions: (1) Diversion of \$100,000 from development fund of San Diego River to construction of Otay pipe line. (2) Diversion of \$75,000 from reservoir fund to reconstruction of pipe lines in Otay and Sweetwater valley and to restoration of Mission valley wells. (3) \$100,000 new bonds for restoring Dulzura conduit.

Santa Maria, Cal.—City has voted in favor of bond issue in sum of \$72,000 for purchase of plant of Domestic Water Co.

Sunnyvale, Cal.—Town engineer has been instructed to go to San Francisco to look at booster pumps for water plant.

Boulder, Colo.—Sewer and water committees of city council held joint informal meeting recently. Construction of storm sewers in connection with paving was discussed. Water committee under chairmanship of John A. Webber, has decided to put in 1,850 ft. of new 16-in. water mains from mouth of Boulder Canon to city pipe line. This was referred to committee at last meeting of council. New line will replace the 12-council. New line will improve in the mains in line. New improvement in the mains, will cost between \$12,000 and \$16,000, according to Water Commissioner Barry. City Engineer George Joslyn showed committee an elaborate exhibit of sands and material, including crushed

rock and cement for storm sewer pipe. It was decided to receive bids covering the laying of the storm sewer pipe.

Kewanee, Ill.—Town will spend \$75,000 on new water works plant. Question of issuing bonds in sum of \$75,000 was submitted to vote of the people Feb. 23 and carried by vote of 969 to 281. This gives funds enough for construction of a fine new plant in center of the city and for sinking 16-in. well to Potsdam formation. Commissioners have ordered advertisement for bids.

Quincy, Ill.—Council has voted to purchase water works plant at cost of \$649,150 and has adopted resolution for \$130,000 bond issue at general election April 14th.

Waukegan, Ill.—Resolution for a 16-in. water supply pipe extending north in Sand St. to city limits was presented at board of local improvements meeting Feb. 28. Estimated cost of improvement is \$6,620.70.

Centerville, Ia.—Following bids were received by Appanoose county March 3 for water works supplies: Midland Metal Mfg. Co., Ottumwa, Ia., at 65 cts. per ft. for 12-in. corrugated pipe; Ottumwa Supply & Constn Co., at \$1.35 for 15-in. boiler pipe, \$1.60 for 18-in. boiler pipe, \$2.10 for 24-in. boiler pipe; Klaver Mfg. Co., Davenport, Ia., at 70 cts. for 12-in. corrugated pipe. A. H. Withington is County Engr.

Emporia, Kan.—Meeting of Emporia city commissioners and 12 or 15 farmers living along Neosho River above proposed site of new dam for water works system, was held Feb. 25. E. B. Black, of Kansas City, of firm of Worley & Black, consulting engineers, and engineer who is to be in charge of work, Alva Smith, were on hand with their blue prints and specifications, in an attempt to show farmers what proposed dam would do and would not do in way of backing up water and causing flood damage. Al Triggs, M. C. Little and Horace Overly, appraisers appointed by district court, will start work of appraisal March 20.

Lawrence, Kan.—Citizens are in favor of purchase of water plant. Election will be held March 14 to vote on bond issue for that purpose.

Topeka, Kan.—City has purchased a new bronze mounted flood gate at cost of \$325, which will replace old one. Contract will be let by city for installation of gate and placing new casing on pump at pumping station.

Paintsville, Ky.—Petition is being circulated in Paintsville asking the town board to build city water works system, bonding town for expense.

Winchester, Ky.—Mass meeting was held recently at court house for purpose of determining next best step to take in securing water from Kentucky River, a distance of 10 miles, 6 miles further than present reservoir. Number of citizens are agitating a move for purchase of plant by city.

Crowley, La.—Layne & Bowler Co., of this city, has contracted with Lake Charles Railway, Light & Water Works Co. to sink a \$20,000 water well supply for that company at Lake Charles. This same company has signed contract to put down two water wells for city of Galveston, capacity of wells to be 3,000,000 gals. daily.

Springfield, Mass.—See "Sewerage."

Buffalo, N. Y.—Communication was sent to council Mar. 1 requesting bond issue of \$150,000 for 24-in. water main in Ellicott St., connecting with 36-in. main in Huron St. Matter was referred to a committee of five and will be considered by the council at next meeting.

Freeport, L. I., N. Y.—See "Streets and Roads."

Le Roy, N. Y.—George Stein, superintendent of Pittsburgh-Des Moines Steel Co., has arrived in town to superintend erection of elevated water tank which is to be put up in connection with new village water system. Tank is to be erected on the G. D. McColl farm in Summit St. and it will have capacity of 125,000 gals. It will be used as auxiliary to old standpipe, which has a capacity of 250,000 gals. It is probable that new water system will be ready for operation early next month.

Rochester, N. Y.—Following bids were received March 1 for 800 net tons of 6, 8, 10, 12 and 16-in. cast iron pipe and 40 net tons of 4 to 16-in. special castings: U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J., at \$29 and \$60 respectively, and R. D. Wood & Co., at \$30.27 and \$60 respectively. Latter bid informal. Contract not awarded.

Hickory, N. C.—Citizens will vote

April 3 on bond issue of \$10,000 for water works extension.

Cincinnati, O.—See "Streets & Roads."

Portland, Ore.—City will sell \$125,000 of 4 per cent. 25-year bonds March 9, for purchase and improvement of St. Johns water works plant.

Portland, Ore.—Attorney R. W. Montague, representing St. Johns Water Works & Lighting Co., has notified Commissioner Daly, of department of public utilities, that 90 per cent of holders of outstanding bonds of company have agreed to the sale of private water system in St. Johns to city for \$108,000, last offer made by the council. He suggested that city attorney be authorized to prepare necessary documents to complete sale and said that as soon as these are ready for signing, company will be in position to make formal transfer.

Erie, Pa.—Thomas Fleming, Jr., of engineer firm of Chester & Fleming, Pittsburgh, appeared before board Feb. 25 with plan of making inspections to improve water supply in various sections of city. Report will be made by Mr. Fleming within a short time, it is expected.

Harrisburg, Pa.—Following permits and decrees were issued by Pennsylvania department of health relative to water works during period from Feb. 1 to 29, 1916: Beaver Falls (Beaver Valley Water Co.)—permit approving plans for temporary changes in coagulant and filter equipment, 10; Cecil township, Washington county (Pittsburgh Coal Co.)—approving plans for water filtration and softening plant, 10; Verona (Suburban Water Co. of Allegheny county)—approving plans for additional filter unit, 10; Hummelstown (Hummelstown Consolidated Water Co.)—requiring improvements at filter plant, 16; Middletown (Middletown and Swatara Consolidated Water Co.)—requiring improvements at filter plant, 29.

Pittsburgh, Pa.—With price of soda ash, extensively used in treating water at municipal plant, soaring from \$13 to \$70 a ton, McKeesport city council has decided to build new intake pipe to Monongahela River. Water is taken from Youghiogheny River. Tests show that Monongahela River water needs practically no soda ash in its treatment. If price of soda ash remains so high McKeesport in a year will have saved more than cost of intake, which will be about \$75,000. Leo Hudson, of Pittsburgh, has been engaged as designing and supervising engineer. It is expected that intake will be completed in four months.

Knoxville, Tenn.—Purchase of new 15,000,000-gallon pump at estimated cost of \$100,000 has been recommended by Commissioner Crumbliss.

New Tazewell, Tenn.—Water plant for New Tazewell is an improvement that will be made at once, it is reliably rumored. Work is expected to begin immediately in order to rush to completion source of abundant water supply for citizens of town. About \$10,000 will be spent on proposed work.

Rogersville, Tenn.—See "Sewerage."

Alice, Tex.—Town has voted in favor of bond issue of \$6,000 for improvement of water works plant.

Corpus Christi, Tex.—Voters of Robstown, second largest town in Nueces County, Feb. 21 defeated proposed issue of \$20,000 40-year bonds, for purpose of installing a system of water works. Vote was 38 to 58.

Dallas, Tex.—City will purchase 3,000 water meters of which 1,500 will be delivered at once and the balance as ordered. Hersey Meter Co. offered lowest price, but sale has not yet been confirmed by factory.

Galveston, Tex.—As suggested by advisory committee of engineers, M. E. Shay, city water and sewer commissioner, Feb. 24 recommended to city commission that city exercise its option and contract with Layne & Bowler, of Houston, for three instead of two new wells at Alta Loma. Recommendation was adopted. Cost, it is said, would be between \$19,000 and \$20,000, instead of \$17,500 for only two wells, as recently planned, together with contractors' agreement to test lower strata than present water strata at Alta Loma. Wells are to be of such capacity that they will yield as much as 1,000,000 gallons each per day.

Berkeley, Va.—Movement is on foot for better water supply.

Wheeling, W. Va.—Members of light and water committee present at meeting held Feb. 25 declared themselves informally as being in favor of well system in

filtration, as recommended by engineers, but voted to defer action until later.

Seattle, Wash.—S. A. Cobb, civil engineer, Oregon City, has been engaged by municipality of Canby, Ore., to prepare plans and estimates for water system requiring pumping plant, standpipe and distributing pipe. Rough estimate of cost is placed at \$20,000. Proposal to issue bonds to raise funds for this work will be voted upon.

Janesville, Wis.—Owing to successful managing of municipal water plant board contemplates reduction in water rates shortly.

CONTRACTS AWARDED.

Rockvale, Colo.—For improving reservoir to Fred Brant, Manzanola, Colo., to cost approximately \$4,578.

Bloomington, Ind.—Thomas Hardin, of Olney, Ill., has been awarded contract to build extension to municipal water works plant of Bloomington for \$58,777. There were 11 other bidders on general contract. Hardin will put in approximately 17,500 ft. of 12-in. mains here to connect up old with new plants and will build additional pumping station. He will begin work as soon as Indiana public service commission approves contract.

Indianapolis, Ind.—Board of public works has awarded contract to Jacob Vogel for construction of back pressure water gate in specially constructed manhole at Harding St. and Kentucky Ave., to prevent large area in West Indianapolis from becoming flooded by water from White River backing up in Harding St. sewer. Vogel agreed to construct gate for \$4,120.

Arcadia, Ia.—For water works system as follows: Distribution system and pump to Alamo Engine & Supply Co., Omaha, Neb., at \$3,919; tower and tank to Des Moines Bridge & Iron Co., Des Moines, at \$2,845. Lawrence W. Cox, Des Moines, is Engr.

Duluth, Minn.—J. B. Clow & Sons awarded contract to furnish water and light department with water and gas gates at their bid of \$2,641.90.

Minneapolis, Minn.—For gate valves for water department for 1916 to Rensselaer Valve Co., Troy, N. Y. F. W. Capelin is City Engr.

Erie, Pa.—Contract for 25 tons of pig lead to be used in laying of water mains this year by water department was awarded to Illinois Smelting & Refining Co., of Chicago, on their bid of \$6.45 per hundredweight, at meeting of commissioners Feb. 25.

Beaver, Pa.—County commissioners have awarded contract for erection of steel water tower at new county home to Des Moines Construction Co., for \$3,425. Tower will be 80 ft. in height and have a capacity of 40,000 gallons. Other bids submitted were as follows: Chicago Bridge & Iron Works, \$3,800; Memphis Construction Co., \$3,416. Des Moines Co., while not lowest bidder, was awarded contract on their guarantee to complete job within two months. Memphis Co., lowest bidder by \$9, would not guarantee completion of job in less than five months.

Groesbeck, Tex.—By city, for improving water works system, to M. Griffin O'Neil & Sons, 1505 Praetorian Bldg., Dallas, Tex.

Houston, Tex.—By city, for 2 centrifugal pumps, with motors, starters, etc., for North Side pumping station, to H. A. Paine, to cost approximately \$4,300.

Temple, Tex.—For 2 centrifugal pumping units, to Smith & Whitney, Dallas, Tex. Estimated cost, \$5,886. J. T. Martin is city secretary.

Tlaga, Tex.—By city for water works system for fire protection to M. Griffin O'Neil & Son, 1505 Praetorian Bldg., Dallas.

Trinity, Tex.—For new water works system to W. Wilder, Houston, to cost approximately \$15,000.

MISCELLANEOUS

Tucson, Ariz.—Council has decided to call bond election for purchase of Elysian Grove for \$30,000 with \$5,000 to fix it up for public park.

Merced, Cal.—See "Sewerage."

Santa Ana, Cal.—City Trustees will ask for bond issue to provide city with oil pits, oil heating plant, new roller, two or three automobile trucks and street sweeper.

Bridgeport, Conn.—Plans are being discussed for municipal collection of ashes.

Pueblo, Colo.—Fifteen bids were received for bond issue of \$300,000 for city hall and auditorium. Successful bidder was N. S. Walpole, Pueblo, Colo. Bid

\$1,600 premium, accrued interest and an agreement to pay 4½% on all funds until money has actually been used by city.

Washington, D. C.—Firm in Norway writes that it is in market for air compressors, lead pipe, drilling machines, drill hammers, air hose and underground cable. Complete list of the requirements of this firm, together with instructions, references, etc., may be examined at bureau or its district offices. (Refer to file No. 98, No. 20325).

Jacksonville Fla.—City council passed bill Feb. 23 to purchase 14 acres in West Riverside for park purposes at cost of \$36,000.

Rome, Ga.—City has voted in favor of bond issue for construction of auditorium.

Quincy, Ill.—Movement is on foot to erect packing plant at cost of \$50,000.

Quincy, Ill.—Council has passed ordinance to build first unit of river terminals between Payson Ave. and Maine St., and adopt resolution to refer \$75,000 bond issue to voters at general election April 4.

Springfield, Ill.—Indications are that bond issues aggregating \$20,000,000 will be voted on this spring by different counties. Latest figures received by the commission show that Jackson, Edwards, White and Sangamon counties are planning to vote on proposition.

Fort Wayne, Ind.—De Carle Co. will be given contract for constructing incinerating plant and it will be located directly alongside No. 2 station, so that steam to be generated by it may be employed to operate pumps in station. The same steam will be used to run asphalt repair plant and heat nearby residences. Contracting company says the plant may be erected within 120 days. Contract will be sent to the council for final ratification on March 7, and an opposition is expected to fight proposition of moving institution farther away from center of city and more completely into residence district of Bloomingdale.

Portland, Ind.—Plans are being discussed for improvement of Salamonie river.

Richmond, Ind.—Council is in favor of purchase of combination auto patrol and ambulance for police department.

Fort Dodge, Ia.—Survey of Des Moines river has been completed and plans will be drawn at once for new \$100,000 municipal dam. Contract probably will be let before April 1.

Muscatine, Ia.—Fuller and Hiller, local firm, bidding against many larger companies, for contract to furnish Keokuk county with 130,000 pounds of reinforcing steel, was successful in making lowest quotation. Steel will be shipped to Sigourney, county seat of Keokuk County, in three cars, and will be used in construction of concrete bridges, piers and other structures during coming year.

Newton, Kans.—City improvement bonds in sum of \$97,300 have been sold to Commerce Trust Co., of Kansas City, at par, accrued interest and premium of \$255. Next bid was from Wright Investment Co., also of Kansas City, who offered par, accrued interest and \$30.50 premium. Dunn & Co., of Wichita, offered to take bonds at par and remit accrued interest from Jan. 11.

Jackson, Ky.—At meeting of Breathitt Fiscal Court it was decided and ordered to build county jail at Jackson and plans were accepted and approved which provide for jail similar to Clark County jail at Winchester, to cost approximately \$40,000.

Louisville, Ky.—With provision that Kentucky and Indiana Railway Terminal Co. improve Butler St., from Main St. to Dewey St. as concession for right of way for switch connecting Pennsylvania railroad tracks with Kentucky and Indiana bridge, board of public works, at its regular meeting recently, adopted resolutions granting right of way. Action of the board, however, must be ratified by city council before it becomes effective.

Newport, Ky.—Erection of municipal garbage crematory is being urged by citizens.

Beverly, Mass.—Board of aldermen has passed order for appropriation of \$25,000 for new bath house for city.

Haverhill, Mass.—Broadway Community Club has presented petition to Council asking for park in its vicinity.

Medford, Mass.—See "Streets & Roads."

Pittsfield, Mass.—Chief W. C. Shepard of fire department is working upon appliance to be used as small snowplow on various pieces of motor-driven apparatus, so that there will be less chance for machines to become stuck after heavy snowfall.

Springfield, Mass.—See "Sewerage."

Minneapolis, Minn.—Ordinances have been introduced for bond issue of \$125,000, \$9,000 and \$60,000 for purpose of improving parks and parkways.

Omaha, Neb.—Commissioner Hummel of park department is preparing specifications for an advertisement for bids on motor-propelled oil distributor for boulevard system. He expects to have this machine in operation early in spring. This five-ton truck will carry tank of 900 to 1,000 gallons capacity and will be equipped with device for spreading oil evenly; also provided with heating arrangement which will permit of oil distribution in cold weather. When not in use during part of winter as an oil distributor tank will be taken off and truck used for hauling cinders and stone for boulevards.

Omaha, Neb.—City will buy four more roadster automobiles. Two will be used by building inspection department, one by slaughter house inspector and the fourth by superintendent of garbage collections.

Long Branch, N. J.—City commissioners Feb. 24 adopted new rules governing awarding of next garbage contract and authorized clerk to advertise for bids. Contract held by Seaboard Utilization Co. expires April 15. Company receives \$10,000 a year for taking care of city's garbage.

New Brunswick, N. J.—Council received following bids for two turbo centrifugal pumps: Thomas J. Radley Co., New York City, \$13,900; Southwark Foundry & Machine Co., Philadelphia, \$10,900; Turbine Equipment Co., New York City, \$13,700. All above bids were accompanied by certified checks for \$500 each, and were referred to director of public affairs.

Brooklyn, N. Y.—It was reported Feb. 26 by bureau of franchises, to board of estimate, that city's share for elimination of grade crossings by Long Island Railroad at Farmers Ave., in the village of Hollis, is not to exceed \$48,500. It was stated that although order of Public Service Commission does not limit city's share of cost, it is a matter of contract between city and company. Time for completing work has been extended to May 1, 1916. A large part of the embankment work has been completed. Viaduct section, which is to be mile or more in length, provides also for carrying of Hamilton Ave. under four main tracks of the Long Island Railroad and entire Holborn freight yard of 12 or 14 tracks, which is to be elevated, in connection with depression of highway. Entire expense of the present undertaking is \$325,000. Next year track elevation will be carried through Queens village to Nassau county line. Cost of entire work—about three miles—will be \$800,000. Under grade crossing act, the city will pay half cost of work through Queens village.

Brooklyn, N. Y.—Contract for construction of Eastern District tunnel to N. 7th St. was formally signed Feb. 29 by Chairman Oscar S. Straus and Secretary Travis H. Whitney of Public Service Commission, and contractors Booth & Flinn, Ltd. Tube must be constructed in 27 months and will cost \$6,639,000.

Brooklyn, N. Y.—New York Municipal Railway Corporation (B. R. T.) Mar. 1 transmitted to Public Service Commission bids it has received for construction of new terminal at Coney Island. Lowest bidder for work is Lord Construction Co., which bid \$1,279,274.25. B. R. T. asks Commission to approve awarding of contract to this bidder. The Commission referred matter to its chief engineer for report, before acting on request. Firms that bid for the work and the figures submitted were: Lord Construction Co., \$1,279,274.25; Post & McCord, \$1,337,139.75; Snare & Triest, \$1,435,953; Wilson & English, \$1,438,387.50; New York & New Jersey Construction Co., \$1,469,445.75; P. J. Carlin Construction Co., \$1,488,783.75; John Thatcher & Sons, \$1,574,832.35; Holbrook, Cabot & Rollins Corporation, \$1,663,435.50; MacArthur Brothers Company, \$1,763,131.80; Rodgers & Hagerty, Inc., \$2,004,170.50; Crenshaw Engineering Co., \$2,025,146.40.

Freeport, L. I., N. Y.—See "Streets & Roads."

New York, N. Y.—Public service commission is preparing for laying of tracks along Lexington Ave. and Jerome Ave. lines. It opened Feb. 24 bids for job, and found that lowest bidder was Empire Construction Co., with \$276,433.55, while next was T. H. Reynolds Contracting Co., with \$304,101. Successful contractor must undertake to complete track laying along Jerome Ave., from Mott Ave. and 138th St. to Woodlawn Rd., in six months, so that if proposed shuttle service along Jerome Ave. as far south as 149th St. is instituted, it should begin running some time in fall. Tracks on Lexington Ave. line below 138th St. and in 149th St. connection, between new Jerome Ave. subway and the Lenox Ave. branch of existing subway, are to be laid within nine months from delivery of contract.

New York, N. Y.—Dreamland Pier, at Coney Island, will cost city \$65,000 to rebuild and not \$55,000, as was originally estimated. Dock Commissioner R. A. C. Smith told sinking fund commission recently that price of building materials had increased. He asked that commission request the board of estimate to appropriate required amount in corporate stock. Coney Island Corporation has leased pier and it is estimated that rental will pay for new construction.

New York, N. Y.—To relieve congestion at Grand Central subway station, Public Service Commission approved Mar. 2 plan suggested by Theodore P. Shonts for new overhead passageway across express tracks, to be built at cost of \$6,000.

Westbury, N. Y.—Plans are being discussed for replacing of culvert which formerly ran under tracks of Long Island Railroad and drained this section.

Hickory, N. C.—Citizens will vote Apr. 3rd on bond issue of \$25,000 for erection of school.

Columbus, O.—Sinking fund trustees notified council's finance committee Feb. 28 of their acceptance of bonds for erection of the Milo and Gragan engine house, Cleveland Ave. near Gibbard Ave. to cost \$25,000. Plans for new house will be made at once, said Safety Director Bargar, under direction of A. Burley of fire department, who has planned last six engine houses built by city. Department of architecture at Ohio State University has offered its help. House will have motor equipment. Chief Daniels said recently that work of motorizing seven city engine houses will begin in two weeks.

Columbus, O.—See "Streets and Roads."

Portland, Ore.—Morris Bros. bid of 98.44 cents on the dollar was highest for \$565,000 public auditorium bonds for which bids were opened Feb. 21 and Commissioner Bigelow, of department of finance, will recommend to council that bonds be sold on this basis. This bid was highest of 13 received for entire issue, lowest for immediate delivery of the bonds being 95.66 cents on dollar.

Harrisburg, Pa.—In order that new auxiliary building to city's asphalt repair plant at Ninth and Shanois Sts. can be finished by time main plant is put into operation this spring, Highway Superintendent Lynch probably will ask council to award contract to Cranford & Stevenson. Firm's bid of \$3,475 was the lowest of half dozen. The contractors say they are prepared to start work at once. Other proposals were as follows: G. W. Ensign, Inc., \$3,997; G. E. Sheffer, \$3,663; Augustus Wildman, \$4,475; M. L. Grossman, \$4,300, and J. Frank Sausseman, \$3,700. For a brownstone building Ensign bid \$3,882.

Pittsburgh, Pa.—City Council, sitting as Committee of Public Service and Surveys, decided to take up question of construction of subway and adopted motion asking Attorney A. O. Fording of Pittsburgh Subway Company and Attorney A. E. Anderson of Pittsburgh District Railways Company to meet it for a conference. Cost is estimated at about \$5,000,000.

Providence, R. I.—City Council finance committee is ready to back down on its announced intention of killing \$300,000 city sea wall equipment loan and substituting \$150,000 measure in its place, and will probably report favorably to Common Council resolution for \$300,000.

Rock Hill, S. C.—At meeting of city council Feb. 28 arrangements were made for borrowing as much as \$20,000 if it be needed during year to meet expenses pending collection of taxes, city securing

THE disposal plant illustrated below is intended to take care of the sewage of the eastern district of Altoona, the P. R. R. shops and the Borough of Juniata for a period of thirty years, or until the population is 50,000. The ultimate equipment will comprise Imhoff tanks, sludge-drying beds and sprinkling filters. The present installation comprises Imhoff tanks and equipment for sterilizing with liquid chlorine.

The plant was designed by George W. Fuller, consulting hydraulic engineer, of New York, and built by D. C. Serber, Inc., under the direction of J. W. Shields, City Engineer, Altoona. ALPHA Portland Cement was used.

ALPHA Cement has been used with marked success in a large number of concrete constructions that are exposed to the action of salt water, sewerage, acids, etc. ALPHA was used extensively in under-water construction on the Atlantic and the Gulf, in great viaducts, the Galveston sea wall, etc., replacing foreign

brands of Portland Cement previously regarded as superior for such work.

In all of the six ALPHA plants the practice of hourly tests by chemists is strictly adhered to. Consequently, when you specify ALPHA you can rest assured that, whether you make your private tests or not, the raw materials of the cement were proportioned with great care, that the burning was thorough, that the grinding was finer than required by standard specifications, that the cement is as high grade as can be produced. Every bag of ALPHA shipped is guaranteed to more than meet all standard requirements.

Six great plants on six trunk-line railroads and one plant with private docks directly on the Hudson River assure prompt service in shipping.

Ask for Art Envelope No. 3, showing many views of distinctive concrete undertakings and for a copy of "ALPHA Cement—How to Use It."

ALPHA PORTLAND CEMENT COMPANY, General Offices: Easton, Pa.
Branch Offices: New York Philadelphia Boston Pittsburg Baltimore Savannah

New Sewage Disposal Plant, Altoona, Pa.



Specify ALPHA —
Tested Hourly and Guaranteed

a rate of .0275 per cent interest. Bids were as follows: People's National Bank, .0275 per cent; Citizens' Bank & Trust Co., .0489 per cent; National Union Bank, .05 per cent.

Sumter, S. C.—Supervisor and county commissioners has been authorized to build new jail at cost not exceeding \$25,000.

Nashville, Tenn.—Through special committee Nashville city commission has filed request with Gov. Rye, asking that he include in his call for special session of legislature authorization for city to issue short time notes in anticipation of revenues to obtain \$250,000 for erection of wharf terminals and connections on Cumberland river at Nashville. After building of wharf terminals has been made possible merchants intend to establish boat line that will quickly make Nashville one of leading river rate towns of south. Plans contemplate placing on Cumberland river over \$400,000 worth of steel boats and barges within 15 months after operations are started.

Dallas, Tex.—See "Sewerage."

Fort Worth, Tex.—Upward of \$100,000 worth of Fort Worth municipal bonds will be bought by city before Sept. 1 if Finance Commissioner Smith can negotiate satisfactory deals. He already is negotiating for substantial purchase and is writing to bond dealers to inquire if they have Fort Worth bonds for sale.

Suffolk, Va.—Suffolk city council at adjourned meeting passed resolution authorizing sale of the 30-year \$70,000 bond issue to Provident Savings & Trust Co., of Cincinnati. Sale was made by Mattu & Co., of Norfolk. Bond issue is for improvement of schools and street extension of sewers, purchase of fire equipment and improvement of police department facilities, etc.

Charlestown, W. Va.—United States government has purchased site of present jail here and on ground is to be built this city's new seventy-five-thousand-dollar post office and federal building. City reserved jail building.

Wheeling, W. Va.—Fourteen bids were opened Feb. 24 for machinery to be used at dams Nos. 12, 14 and 20 in Ohio river. Chief Engineer S. A. Anthony said that awards would be made in a few days. Dam No. 12 is at Warwood. It was stated at engineers' office that this dam will be completed and ready for operation this summer, if all plans carry. Dams Nos. 14 and 20 are located between

here and Huntington. Bids follow: Lot (A) two vertical water turbines, S. Morgan Smith Co., of York, Pa., bid \$2,258 for dam No. 12, \$2,272 for dam No. 14, and \$2,790 for dam No. 20. Trump Mfg. Co., of Springfield, O., bid \$2,000 for each of three contracts. Lot (B), three air compressors, Engersoll & Co., of Chicago, bid \$2,519.60 for dam No. 12, \$2,529.20 for each of other two dams. Berry Compressing Co., of Erie, Pa., bid \$1,090 for each of three contracts. Lienke, Wagner Pump and Supply Co., of Pittsburgh, bid \$2,702 for each of three contracts. Lot (C), 32 river wall valve jacks, J. B. Holl & Co., of Pittsburgh, bid \$2,800 for each of three contracts. Thomas Carlin's Sons Co., of Pittsburgh, bid \$4,950 for each of three contracts. New Jersey Foundry and Machine Co., of New York, bid \$6,464 for each of three contracts. Lot (E), two gate engines, Lenher Engineering Co., of New York, bid \$1,200 for each of three contracts. J. B. Holland Co., of Pittsburgh, bid \$1,595 for each of three contracts. H. B. Gazzan Machinery Co., of Pittsburgh, bid \$1,505 for each of three contracts. American Holst & Derrick Co., of Pittsburgh, bid \$1,572 for each of three contracts. Becker Machinery Co., of Pittsburgh, bid \$1,313 for each of three contracts. Lot (F), air receiver and oil pump. Berry Compressing Co., of Erie, Pa., bid \$245 and \$127 for each of the three contracts. J. B. Holland Co., of Pittsburgh, bid \$356 and \$155 for each of three contracts. Thomas Carlin's Sons Co., of Pittsburgh, bid \$207 and \$73 for each of three contracts.

Seattle, Wash.—Board of county commissioners have awarded contracts for renewal of portion of Nahcotta dock, clearing, grubbing, grading and draining three sections of Mill Creek road, and renewal of portion of trestle on Bay Center dike road near Bay Center to G. G. Hall and Dan Coulter. Contract for renewal of piers and approaches of Shinook river bridge has been awarded to Johnson & Coulter, and contract for clearing, grubbing, grading and draining of state road No. 19 was awarded to Burnett Construction Co., Seattle.

Tacoma, Wash.—Ordinance is before council providing for submitting \$130,000 general bond issue to voters in April to take up municipal street railway warrants in amount of \$30,000 and to provide for payment of \$100,000 judgment George P. Wright secured against the city. Bonds will bear 4½ per cent interest and run twenty years, whereas warrants and judgment are drawing 6 per cent interest.

Milwaukee, Wis.—See "Sewerage."

CONTRACTS AWARDED.

Pasadena, Cal.—To Westinghouse Co. for regulators, at \$8,200.

Hahnman, Ill.—For 36,000 cu. yds. ditch in District No. 2 to W. E. Long, Sheffield, Ill., at 15½ cents per cu. yd.

Kokomo, Ind.—Seth Werden was given contract for last ten months of this year. Werden's bid was \$1,989. Contract was let for only ten months in order that next contract can start out January 1. There were three other bidders. However, all were above appropriation that is left in this year's fund. Lon. Butcher bid \$2,472.60, John Wilson bid \$2,500, B. F. Smith bid \$2,300.

Charles City, Iowa.—To P. A. Thompson, Greene, Iowa, for drainage district No. 1 at bid of \$16,250.

Clinton, Ia.—To Klauer Mfg. Co., Dubuque, Ia., for supplying of lumber and corrugated iron culverts for coming year at \$4,000 approximately.

Clinton, Ia.—To Joyce Lumber Co., local, for supplying of lumber and corrugated iron culverts for coming year at \$2,475 approximately.

Lexington, Ky.—D. M. Moynahan was successful bidder for work of collecting garbage and operating City Crematory for next twelve months. Bids were opened at meeting of Commissioners Feb. 26. His price was lowest submitted, \$7,145.

Perth Amboy, N. J.—Contract for supplying 125,000 gallons of fuel oil for operating engines at new municipal light plant was awarded to Intercean Oil Co. at 4½ cts. a gallon, at adjourned meeting of the board of aldermen Feb. 26.

Perth Amboy, N. J.—To Michael Walsh at \$11.25 per week, for collecting garbage. Other bidders were as follows: Vincent J. Abbatello, \$1,800 per year; Geo. W. Maxfield, \$57 per week; P. F. Fallon, \$1,950 per annum; Joseph Quinland, \$2,350 per year; David Quinland, \$1,755 per year.

Binghamton, N. Y.—To Schaefer Construction Co., of New York, at \$65,679 for addition to Court House at following bid: Building, \$62,499; heating, \$1,176; plumbing, \$1,255; lighting, \$779.

Wilmington, O.—Hamilton Construction Co., which was recently incorporated, Feb. 23 received notice that it has received contract for construction of jail section in court house to be erected at Wilmington, O., at its bid of \$21,000. Weber, Werner & Adkins of Cincinnati announced awards Feb. 22.

Portland, Ore.—Hands Pederson was awarded the contract by council for the construction of the superstructure of Portland's public auditorium for the sum of \$320,262.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Mass., Attleboro	noon, Mar. 9..	Constructing steam road roller house.....	H. J. Goodale, Supt. P. Wks.
Mass., Boston	noon, Mar. 13..	135,000 ft. straight and 11,000 ft. circular edge stone and other street supplies.....	D. F. Doherty, Supt. of Supplies.
Ill., Elgin	10.30 a.m., Mar. 15..	7,776 yds. asphaltic concrete and 14,500 yds. brick.....	M. H. Brightman, City Engr.
N. Y., New York	2 p.m., Mar. 16..	Repairs to asphalt pavements on Harlem River bridges.....	F. J. H. Kracke, Bridge Comr.
N. Y., Buffalo	11 a.m., Mar. 18..	Eliminating grade crossings.....	Grade Crossing Commission.
Minn., St. Paul	10.30 a.m., Mar. 20..	47,600 yds. yellow pine paving blocks, 4,523 sq. yds. brick, 20,000 bbls. Portland cement, crushed stone, sand, screens, 670 tons asphaltic cement, reinforcing bars, pitch filler, etc.....	Aug. Hohenstein, Pur. Agent.
Conn., Waterbury	8 p.m., Mar. 21..	Furnishing 175,000 gallons asphaltic road oil; applying the same.....	W. E. Kennedy, Supt. of Sta.
Ind., South Bend	10 a.m., Mar. 28..	Constructing pavements.....	V. Sweeney, Clk. Bd. P. Wks.
O., Columbus	noon, Mar. 28..	Grading, draining, curbing and paving road.....	John Scott, Clk. Co. Comrs.
Minn., Duluth	noon, Mar. 31..	Constructing 6.66 miles rock and gravel road.....	J. B. Haskins, Clk. Twp. Bd.
SEWERAGE				
Mass., Boston	noon, Mar. 9..	430,000 sewer brick and 422,000 paving brick.....	D. F. Doherty, Supt. of Supplies.
Cal., Sacramento	11 a.m., Mar. 14..	Constructing sewers in several streets.....	M. J. Desmond, City Clerk.
Ky., Lexington	10.30 a.m., Mar. 17..	Constructing 1,650 ft. 8-in. and 975 ft. 5-in. sewer.....	W. H. McCormick, Comr. P. W.
Minn., St. Paul	10 a.m., Mar. 20..	About 13,000 sewer bricks and 10,000 ft. of sewer pipe.....	Aug. Hohenstein, Pur. Agent.
Ia., Keota	Mar. 22..	1½ miles 8 to 10-in. sanitary sewer, 13 manholes and 5 flush tanks.....	Iowa Engineering Co., Clinton, Ia.
N. Y., New York	10.30 a.m., Mar. 30..	Constructing several long sewers, 12 to 96-in. (mostly concrete).....	Douglas Mathewson, Pres. Bronx Boro.
Ind., Lafayette	Apr. 5..	18,211 ft. 15 to 36-in. sewer; estimated cost \$73,819.....	H. B. Overesct, Jr., City Engr.
WATER SUPPLY				
Mass., Boston	noon, Mar. 10..	225 tons iron castings, 100 tons arsenate of lead.....	D. F. Doherty, Supt. of Sup.
Ind., La Porte	9 a.m., Mar. 18..	Excavating and back filling water mains during 1916.....	W. F. Krueger, City Clk.
Minn., St. Paul	10.30 a.m., Mar. 27..	Two motor driven pumps, 5,000 gals. per min. capacity.....	Aug. Hohenstein, Pur. Agent.

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The greatest care is used in the mixing and laying of the BITULITHIC pavement. It renders unfailing service.

BITULITHIC is constructed for all kinds of traffic. It is composed of varying sizes of the best stone obtainable combined with bituminous cement and laid under close laboratory supervision.

The integrity of the construction of BITULITHIC and the satisfaction of municipalities which have and are still using it, far outweigh any saving in first cost.

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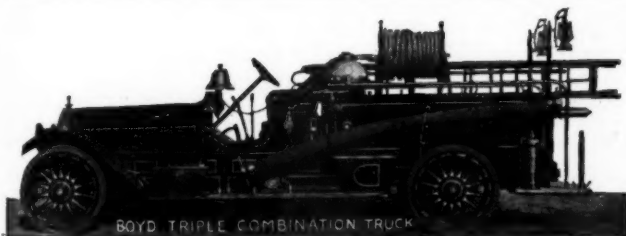
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Made of the highest grade fabrics in three or more plies (each ply a hose in itself) and woven in a continuous circular form (not flat). It is exceedingly strong, light and durable.

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Manufacturers of COMPRESSED AIR FIRE WHISTLES,
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Cor. Duane and Church Streets NEW YORK

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MUNICIPAL JOURNAL

PROPOSALS

NOTICE TO CONTRACTORS:—STATE OF NEW YORK, Office of the State Commission of Highways, Albany, N. Y.—Pursuant to the provisions of Chapter 30, Laws of 1909, as amended by Chapter 646, Laws of 1911, and Chapter 80, Laws of 1913, sealed proposals will be received by the Undersigned at the office of the State Commission of Highways, 55 Lancaster Street, Albany, N. Y., at 1 o'clock P. M. on Tuesday, March 28th, 1916, for furnishing and delivering bituminous materials "A," "T" and cold patch asphaltic emulsion in the different counties comprising Divisions Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 9, BITUMINOUS MATERIAL CONTRACTS NOS. 1 to 25, inclusive. Tables and specifications showing the approximate quantities may be seen and obtained at the office of the Commission in Albany N. Y. The special attention of bidders is called to the fact that separate proposals will be received for each Division for furnishing and delivering bituminous materials "A," "T" and cold patch asphaltic emulsion as designated in detail by Divisions on tables prepared for that purpose.

Each proposal must be accompanied by a draft or certified check issued by a National or State Bank in good credit within the State and payable at sight to the order of the State Commission of Highways, for an amount equal to at least 5 per centum of the amount of the proposal which such draft or check accompanies. This draft or check will be held by the Commission until the contract is executed, and the bond is filed.

The successful bidder on each proposal will be required to give a bond for 50 per centum of the amount of the contract, such bond to be executed by a Surety Company to be approved by the Commission. The bond is for the purpose of insuring the delivery of the bituminous material as called for by the Commission.

The right is reserved to reject any or all bids.

EDWIN DUFFEY,
Commissioner.

I. J. MORRIS,
Secretary.

OIL

Sealed bids will be received by the Board of Public Works, Waterbury, Conn., until 8 P. M., March 21, 1916, and then opened, for furnishing 175,000 gallons of Asphaltic Road Oil. Oil to be delivered on request of Superintendent of Streets, Waterbury, Connecticut, Street Department Siding, in Tank Cars, of either 6,000 or 10,000 gallons capacity. Certified check for \$500.00 payable to M. D. Russell, Comptroller, must accompany each bid. This sum will be forfeited should the bidder refuse or neglect to enter into contract, if called to do so, within five days after award is made. Specifications for oil and instructions to bidders may be seen at the Street Department office, 154 Benedict Street, City. The Board reserves the right to reject any or all bids. Bids should be marked "Proposals for Road Oil" and should be addressed to the City Clerk, Waterbury, Connecticut.

APPLICATION OF OIL.

Bids will also be received at the same time and place for applying the above oil, during the Season of 1916, to the streets of Waterbury, Connecticut, under the direction and supervision of the Superintendent of Streets. Certified check to the amount of \$200.00 payable to M. D. Russell, Comptroller, guaranteeing a satisfactory performance of the work, shall accompany each bid. The Board reserves the right to reject any or all bids. Bids should be marked "Proposals for Applying Road Oil" and should be addressed to the City Clerk, Waterbury, Connecticut.

W. E. KENNEDY,
Supt. of Streets.

FIRE APPARATUS

Proposals will be received by Ford City Borough, until 7.30 P. M., March 27, 1916, for the furnishing of one (1) combination chemical and hose Fire Truck, motor driven, of not less than 75 H.P.

Two (2) forty-gallon Tanks. Bed to hold one thousand feet of two and one-half (2½) inch hose.

The Borough reserves the right to reject any or all bids.

FORD CITY BOROUGH,
D. O. Crouch, Secy.,
Ford City, Pa.

STREET CLEANING BIDS

SEALED BIDS will be received until 12 o'clock noon, Friday, March 24, 1916, by Fred H. Gates, City Clerk, Wilkes-Barre, Pennsylvania, for furnishing all labor and appliances and cleaning forty-five miles of paved streets in the City of Wilkes-Barre. Bidding bond and certified check required. Specifications and bidding blanks will be furnished upon application to Fred H. Gates, and all bids should be plainly endorsed "Bids for Street Cleaning" and addressed to Fred H. Gates, City Clerk. The City Council reserves the right to reject any or all bids received.

MARTIN C. MURRAY,
Superintendent of the Department of Streets and Public Improvements.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., February 24, 1916.—Sealed proposals will be opened in this office at 3 p. m., April 6, 1916, for the construction complete of the United States post office at Valley City, N. Dak. Drawings and specifications may be obtained from the custodian of site at Valley City, N. Dak., or at this office, in the discretion of the Acting Supervising Architect, Jas. A. Wetmore, Acting Supervising Architect.

WANTED

One tandem roller for paving work. Price must be right. Send information to—Neill Construction Company, c/o Municipal Journal.

FOR SALE

One Standard 10-ton Macadam Roller, used very little. Will make low price for quick sale. Write—Thomas J. Reynolds, c/o Municipal Journal.

FOR SALE CHEAP

Wrought Pipe, second hand, all sizes, recut and rethreaded suitable for all classes of work. Prices quoted on application.

MARINE METAL & SUPPLY CO
167 South Street, New York City

BRIDGE BIDS WANTED

Sealed proposals will be received by the Chairman of the Street and Alley Committee of the City of Rockford, Illinois, until 1:30 o'clock P. M., April 10, 1916, for the construction of a reinforced concrete bridge over Rock River at Chestnut Street, the bridge to be approximately 450 feet long and 66 feet in width. Estimated cost \$90,000.00. Bidders to furnish their own plans and specifications. For further information address Edwin Main, City Engineer of the City of Rockford, Illinois.

H. J. GALLAGHER,
Chairman Street & Alley Committee.
Rockford, Ill.,
March 7, 1916.

FOR SALE

One "OO" Austin Trenching Machine with ten-foot extension, nearly new. Address J. E. Poin-dexter, Receiver, Fayetteville, Tennessee.

FOR SALE

One Demming Deep Well Pump with power head for motor drive, has 5-inch working barrel, 225-foot suction; will pump 86 gallons per minute against 350-foot head. In first-class condition, used about 6 months. Address, Superintendent Water Works, Barnesboro, Pa.

STREETS AND ROADS

Princeton, Ky.—Caldwell Fiscal Court adopted resolutions to effect that public interest demands improvement and construction of Princeton and Eddyville pike for a distance of 2½ miles, beginning at city limits. Caldwell county has set aside \$3,500 for maintenance and building of public roads for this year, and petition has been sent to State Road Commissioner asking that state appropriate a like amount. Petition will be circulated within next few days, asking county judge to call an election for purpose of voting bonds to macadamize the county seat roads of Caldwell county.

North Adams, Mass.—City contemplates widening of Eagle St.

Woodbury, N. J.—City plans to improve five thoroughfares with proceeds of bond issue of \$25,000.

Passaic, N. J.—Following bids were received for laying of sheet-asphalt pavement and improvement in Dayton Ave.:

	Union Bldg. & Con. Co.	J. T. Harrop Co.	E. C. Humphrey.	Uvalde A. P. Co.
Sheet-asphalt pavement	1.53	2.45	1.85	1.70
Reset curb in concrete	.28	.35	.35	.35
Header curb in concrete	.70	.70	.70	.70
Round curb corners	12.00	12.00	12.00	12.00
Manhole heads reset	5.00	5.00	5.00	5.00
New Manhole and cover	50.00	50.00	50.00	50.00
New M. H. frames and covers	14.00	18.00	10.00	10.00
Leader drains	.25	.40		.50
Noiseless lead rings	1.00	1.00	8.50	1.00
Earth excavation	.38	.50	.50	.60
Granite pavement	3.50	3.90	4.00	3.50
Stone pavement	.40	.40	.40	.40